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BUREAU OF HYGIENE AND TROPICAL DISEASES.

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THE TYPHUS GROUP OF FEVERS.

MADRAS: REPORT OF THE KING INSTITUTE OF PREVENTIVE MEDICINE, GUINDY, FOR THE YEAR ENDING 30TH SEPTEMBER, 1936 [SHORTT (H. E.), Director]. [**Typhus** pp. 30–32.]

Two cases of typhus had been recently reported in St. Thomas Mount not far from the Institute.

With a view to the discovery of a vertebrate reservoir and the arthropod vectors; squirrels and their ectoparasites were first examined. One hundred and thirty-four squirrels were tested for the Weil-Felix reaction, 58 gave negative results and 66 agglutinated *Proteus OXK* from 1/25 to 1/200 dilution. Seventy-five ticks, 700 lice, 385 mites and fleas were collected from the nests of squirrels and from the animals themselves and injected into guineapigs, but without result, nor could any Rickettsia be detected in smears from the crushed parasites. The examination of 90 bandicoots and their parasites also gave negative results. *D. Harvey.*

CUMMING (Hugh S.). Le typhus exanthématique aux États-Unis. [**Exanthematic Typhus in the United States.**]—*Bull. Office Internat. d'Hyg. Publique.* 1938. Feb. Vol. 30. No. 2. pp. 296–297.

Cases of typhus reported in the United States since 1931 are as follows:—

Year	Cases	Year	Cases
1931	300	1934	1,307
1932	904	1935	1,195
1933	1,922	1936	1,662

The majority of the cases in 1936 occurred in the Southern States; Georgia, Alabama and Texas. Practically all the cases were endemic typhus and few or no cases of louse-borne typhus were reported.

These cases of endemic typhus which at first were confined to urban areas are now reported in increasing numbers from rural areas, and new reservoirs of the virus have been found in field mice, rats, marmots and squirrels. *D. H.*

DELBOVE (P.), CANET (J.) & TRUONG-VAN-HUAN. Note sur une petite épidémie de typhus tropical survenue dans un groupe de plantations du Cambodge. [**A Small Epidemic of Tropical Typhus (Scrub Typhus) in a Group of Plantations in Cambodia.**]—*Bull. Soc. Path. Exot.* 1938. June 8. Vol. 31. No. 6. pp. 457–460.

Twenty cases were reported ; these were scattered about in several villages. Clinically there was fever of sudden onset which lasted from 10 to 15 days but neither rash nor primary sore could be detected in any one of the patients. There were three fatal cases with stupor and an extreme degree of wasting. Sixteen of the cases showed a positive Weil-Felix reaction for *Proteus OXK* negative for *OX19*. All the patients were male coolies engaged in clearing scrub in the forest regions, there were no cases in women or children who remained in the villages. The cases occurred during the rainy season when the low country was flooded and the rodent population were driven up into the higher forest country where the men were working. *D. H.*

BLANC (G.), GOIRAN (E.) & BALTAZARD (M.). Observation de deux cas de fièvre boutonneuse à Conakry (Guinée française) et découverte, chez les rhipicéphales de la région, du chalcidien parasite *Hunterellus hookeri*. [**Two Cases of Boutonneuse Fever observed at Conakry in French West Africa, Guinea Coast.**]—*Bull. Soc. Path. Exot.* 1938. Jan. 12. Vol. 31. No. 1. pp. 23–28. With 1 chart. [16 refs.]

These cases, although they occurred in West Africa, derived the infection from a dog which had been brought by ship, by one of the patients, from Marseilles.

The first case was that of the wife of a Government official who had arrived in the country 10 days before she became ill. This lady had brought with her from France a pet dog and this dog had been housed with other dogs on the ship and had not been seen by the owner till arrival at Conakry. The illness was typical of boutonneuse fever with primary sore, profuse rash and negative Weil-Felix reaction. Almost on the same day and hour the husband was taken ill with precisely similar symptoms. The dog had been allowed to sleep on their bed and several ticks were found on it. *D. H.*

PELTIER (M.), CARRIÈRE (Ch.), JONCHÈRE (H.) & ARQUIÉ (E.). Premier cas de fièvre boutonneuse au Sénégal. [**The First Case of Boutonneuse Fever reported in Senegal.**]—*Bull. Soc. Path. Exot.* 1938. Jan. 12. Vol. 31. No. 1. pp. 29–32.

Cases of endemic typhus have already been reported in Senegal. In the present case a definite eruption could be felt under the skin, although no *tache noire* could be detected, joint pains and pains in the neck, also pains in the muscles and tenderness on pressure, with exaggerated reflexes. On the 10th day of the fever the patient's serum agglutinated *Proteus OX19* 1/300 and *Proteus OX2* 1/100, on the 21st day the results were *Proteus OX19* 1/500 and *Proteus OX2* 1/2000 ; in contrast with two cases of endemic typhus in which *OX19* was agglutinated 1/50,000 and *OX2* only in 1/200.

Animals inoculated developed slight fever without orchitis. The pet dog belonging to the patient was infested with numerous Rhipicephalus ticks; this dog had never been away from Senegal.

D. H.

DREBOHLAV (Jaroslav). Le typhus exanthématique en Tchécoslovaquie. [**Typhus in Czechoslovakia.**]—*Bull. Office Internat. d'Hyg. Publique.* 1938. Feb. Vol. 30. No. 2. pp. 317–325. With 3 figs.

During the years following the great war, 1920–23, there were numerous cases all over the country. From 1924 to 1933 no cases occurred in the western areas of Bohemia. Cases were confined to the areas bordering on Poland, *i.e.*, Slovakia and Sub-Carpathia.

During 1934–37 vaccination by means of Weigl vaccine was carried out in these infected areas and now only sporadic cases are met with.

The infection is usually carried over the frontier by smugglers from both sides. In order to carry out the campaign against typhus a motor steam disinfector and ambulance tour the districts with a doctor and trained personnel; cases are removed to hospital and contacts disinfested. Schools are provided with sprays and children are educated in lousing.

D. H.

ALAIN (M.) & DELBOVE (P.). Sur quelques cas de fièvre exanthématique avec "ulcère primaire" observés en Indochine méridionale. [**Some Cases of Fever of the Typhus Group with Primary Sore observed in Indo-China.**]—*Bull. Soc. Path. Exot.* 1938. June 8. Vol. 31. No. 6. pp. 453–456.

These four cases were all in Europeans and occurred during the rainy season. Three gave a positive Weil-Felix reaction with *Proteus OXK.*

The first was a very severe case with a marked primary sore and inflamed lymphatics and glands. The other three were milder cases but all showed the typical primary sore and a generalized maculopapular rash.

Guineapigs were inoculated with the blood of one patient taken at the height of fever and developed fever, but no scrotal reaction. The author is of opinion that these cases are closely allied to Japanese river fever.

D. H.

RAYNAL (J.). Note préliminaire sur le typhus exanthématique à Changhai (Concession Française). [**A Preliminary Note on Typhus in Shanghai (French Concession).**]—*Bull. Soc. Path. Exot.* 1938. Apr. 6. Vol. 31. No. 4. pp. 256–258.

Louse-borne relapsing fever is frequently met with in Shanghai. Recently a case of fever was seen in a European. A definite typhus rash developed and when the Weil-Felix reaction was tested a positive reaction for *Proteus OX19* was obtained. Following on this case 13 other cases have been met with in which the Weil-Felix reaction was positive. All these cases occurred during the winter in conjunction with relapsing fever cases and are probably louse-borne. No virus has yet been isolated.

D. H.

GERMAIN (A.) & MORVAN (A.). Un cas de fièvre exanthématique à Lorient. [**A Case of Fever of the Typhus Group at Lorient.**]—*Bull. Soc. Path. Exot.* 1938. June 8. Vol. 31. No. 6. pp. 508–514. With 1 chart.

A sailor employed on a fishery guard vessel on the Brittany coast developed fever on return from leave at Lille. He passed through a typical attack of fever with rash but without any primary sore. His serum gave a positive Weil-Felix reaction but in low dilutions for *Proteus OX2* and *OX19*. None of the other men on the ship was ill and none gave a positive reaction. The interesting point is that so far no cases of boutonneuse fever have been reported from the Atlantic coast of France except one or two imported cases on ships of war visiting Brest from the Mediterranean. This man had not been away from his ship, except for the short leave to his home, for many months.

D. H.

LE CHUITON (F.), PIROT (R.), BERGE (Ch.) & PENNANEAC'H (J.). La voie digestive dans la transmission du typhus murin à bord des bâtiments de guerre. [**The Digestive Route in the Transmission of Murine Typhus on Board Ships of War in Toulon Harbour.**]—*Bull. Acad. Méd.* 1938. Feb. 8. 102nd Year. 3rd Ser. Vol. 119. No. 6. pp. 175–178.

The authors note that it has been proved that the virus of typhus may be present in the urine of rats and that this virus is viable on foodstuffs contaminated with infected urine for at least 48 hours.

They point out that most of the cases on the ships occur at the season when flies are least numerous ; also examination of patients has not shown any evidence of flea bites. No cases have so far occurred among officers ; the authors explain this by the fact that the food of the officers, especially the bread, is carefully stored and is not accessible to rats, whereas the bread eaten by the men is distributed to individuals and often left lying about on the 'tween decks and attracts the rats.

The authors are now of opinion that the majority of the cases are due to the eating of bread which has been contaminated by the urine of infected rats. Acting on this supposition the authors introduced a system of careful storage of foodstuffs so that contamination could not take place ; these food cupboards were installed in August 1936 and a remarkable fall in the number of cases has since occurred. Previously rat destruction was relied on but this was abandoned when the food stores were supplied. Up to 1935 there were usually 20 to 30 cases per annum on the 3 ships in the harbour ; in 1935 there were 34 cases, in 1937 only 4 cases were detected. *D. H.*

BRIGHAM (George D.) & DYER (R. E.). **Endemic Typhus Fever in Native Rodents.**—*Jl. Amer. Med. Assoc.* 1938. Jan. 15. Vol. 110. No. 3. pp. 180–183. [33 refs.]

This paper reviews the subject of endemic typhus in the south-eastern parts of the United States ; the incidence of the disease has undoubtedly increased and there is a tendency to a spread of the disease from the original foci in towns out into the surrounding rural area.

The possibility of other rodents than the rat serving as reservoirs of the disease is put forward. Eight species of animals, chiefly rodents common in the typhus infected areas of the United States, have been shown to be susceptible to the virus. These included opossums, various species of field mice, rats and the flying squirrel. In addition to this the authors have examined mice and rats caught in the rural areas of Alabama and succeeded in isolating a virus of endemic typhus from a field mouse. *D. H.*

CHUNG (Huei-Lan) & CHANG (Joseph H. M.) **Studies on the Etiology of Typhus Fever in North China.**—*Chinese Med. Jl.* 1938. June. Vol. 53. No. 6. pp. 513–538. With 2 text figs. & 4 plates. [28 refs.]

Among 50,000 patients admitted during recent years to the Union Medical College Hospital in Peiping 450 were diagnosed as typhus. Three or four Weil-Felix tests were carried out on each case and a high percentage gave positive results with *Proteus OX19* in a dilution of 1280.

Careful post-mortem examinations were carried out on 10 fatal cases. Typhus nodules in the brains of all these cases were found in large numbers. The fever in these cases of typhus lasted on an average 2 weeks and the mortality was 10 per cent.

The present paper deals particularly with one case which was studied in detail. The patient was a young man who was admitted to hospital from a poorhouse where the residents (160) were destitute, ill-fed and louse-infested. Forty people were reported to have died in this house from " fever," probably typhus and relapsing fever. This patient had a severe fever lasting 19 days with stupor and delirium. The crisis occurred on the 18th day. The Weil-Felix reaction tested on the 7th day of fever was negative, on the 12th day it was positive for *Proteus OX19* in 1/320, three days later in a dilution of 1/1280. On this date the serum also agglutinated an emulsion of *Rickettsia prowazeki*. Guineapigs inoculated with the blood of the patient developed fever but no orchitis. The serum of these animals agglutinated an emulsion of Rickettsia. Body lice, which were numerous, were collected from the clothing of the patient on the 7th day of the fever, emulsified and injected intraperitoneally into guineapigs; these also developed fever after the usual incubation period. Clean laboratory-bred lice were fed on the patient 16 days later; the majority were found to be heavily infected with Rickettsia. Some of these were injected into guineapigs and fever resulted. This virus was readily passaged through a series of guineapigs. Lice which had been fed on the patient were later fed on the skin of a guineapig; this animal also became infected.

Laboratory-bred lice were inoculated intrarectally with emulsion of brain of a guineapig infected with the virus isolated from the patient. Numerous Rickettsia were found in these lice from the fifth day onward. Sections were prepared from these lice and stained. The intracellular position of the Rickettsia was clearly demonstrated in such sections; epithelial cells of the intestine of the lice contained masses of Rickettsia and some of these were seen separated in the lumen.

Twenty-five guineapigs were infected with this virus; of these 16 were males; none of these showed orchitis nor was any fever noted in

white rats inoculated. Typhus nodes were few and far between in the brains of infected experimental animals.

Except for this last observation all the evidence points to the fact that the virus under investigation was a true epidemic or historical typhus virus and not a murine virus. *D. H.*

ZINSSER (Hans), WEI (H.) & FITZPATRICK (Florence). **Further Studies of Agar-Slant Tissue Cultures of Typhus Rickettsiae.**—*Proc. Soc. Experim. Biol. & Med.* 1938. Mar. Vol. 38. No. 2. pp. 285–288. With 2 figs.

Certain modifications of the method have been found advisable. The agar for the cultures is now prepared as follows: 150 cc. of Tyrode solution double strength is added to 150 cc. of normal horse serum and 150 cc. 4 per cent. agar in distilled water. Phenol red is added as indicator, reaction *p*H 7·4 to 7·6. The tissue employed is mouse embryo and is mixed with infected tissue in large tubes and then run over the surface of the agar tubes.

Employing this culture medium large quantities of Rickettsia are obtained and these cultures are suitable for preparation of vaccines with the human typhus virus. *D. H.*

BARYKINE (W.), in collaboration with A. KOMPANEEZ, A. BOTCHAROWA & H. BAUER. Nouvelle méthode de culture du virus du typhus exanthématique. [**A New Method of Culture of the Virus of Typhus.**]—*Bull. Office Internat. d'Hyg. Publique.* 1938. Feb. Vol. 30. No. 2. pp. 326–331. With 4 figs.

Fertilized eggs are incubated at 39°C. for 3 days; the infective material 0·1 cc. (brain of infected animal) is injected into the yolk of the egg close to the embryo; the eggs are then incubated at a temperature of 32°C. for 7 to 8 days. Employing this method the author claims that very large amounts of virus in increasing quantity are produced; also the method is easy to carry out. *D. H.*

KASAHARA (Shiro), YOSHIDA (Shizuo) & OKAMOTO (Yutaka). **Filtration Experiments of the Virus of Endemic Typhus.**—*Kitasato Arch. Experim. Med.* 1938. Apr. Vol. 15. No. 2. pp. 143–161. [24 refs.]

The materials used in these experiments were the tissue cultures from guineapigs infected with the virus of murine typhus and emulsions of the organs of infected animals. These cultures and emulsions were diluted in Ringer's solution, then centrifuged and the supernatant fluid was filtered through Berkefeld filters. Four new and five old filters were employed and filtration lasted 2 to 30 minutes under a negative pressure of 200 mm. of mercury. After filtration 2 cc. of the filtrate were inoculated into the testicle of a rabbit and after one week the animal was killed and the testicle emulsified and inoculated into the testicle of a second rabbit and intraperitoneally into two rabbits. This was continued in series. The idea being that the amount of virus which passes the filter is so small that it fails to infect directly but can be multiplied by passage through the testicle of rabbits and can then be demonstrated.

Guineapigs inoculated from the 1st, 2nd and 4th generation of rabbits became infected and showed typical symptoms of infection, fever and scrotal swelling and Rickettsia were found in smears from the tunica. This demonstration of Rickettsia is regarded by the author as the definite evidence of the passage of the virus through the filter. Filtrate of the infected rabbit testicle was also inoculated intraperitoneally into mice and passaged in these animals at the 6th generation. Rickettsia could be demonstrated in the mice.

D. H.

DELBOVE & NGUYEN-VAN-HUONG. Note au sujet d'un virus de "typhus tropical" isolé à Saigon. Infection expérimentale du cobaye. [**Note on the Subject of a Virus of "Tropical" (Scrub) Typhus isolated in Saigon.**]—*Bull. Soc. Path. Exot.* 1938. Feb. 9. Vol. 31. No. 2. pp. 86–89.

Guineapigs inoculated with this virus developed fever but none showed orchitis. All the guineapigs lost weight to a marked degree and at least 50 per cent. of the animals died. At post mortem ascites and pleural effusion were noted in the experimental animals and Rickettsia were seen in large mononuclear cells. Twenty-one of the animals which recovered from the effects of the inoculation were later tested with the Pekin typhus virus; none was immune.

The authors are of opinion that the effects of the inoculation of the Saigon virus resemble those produced by Rocky Mountain fever virus rather than the virus of Tsutsugamushi fever. *D. H.*

WU (Chao-jen) & ZIA (Samuel H.). **Experimental Study of Typhus Viruses from Peiping and their Cross Immunity with the Mexican Strain.**—*Chinese Med. Jl.* 1938. Mar. Supp. No. 2. pp. 221–226. With 1 chart.

The strains of Rickettsia isolated from the typhus patients in the Peiping Union Medical College Hospital were found to be of two types. One of them gave typical scrotal swelling in guineapigs with Rickettsia bodies easily found in tunica material. The other showed no such swelling. The scrotal swelling produced by the local and the Mexican strains disappeared after a number of passages in male guineapigs. The "typhus nodules" are regularly present in the brains of guineapigs infected with those strains causing no scrotal swelling while only sparingly found in those infected with strains which caused such swelling. Cross immunity tests demonstrate complete protection between the Mexican and the local strains which caused scrotal swelling, but incomplete protection with those causing no swelling. It seems justifiable to conclude that there are two types of typhus Rickettsia in Peiping and neighbourhood, one resembling the endemic and the other the epidemic type. *D. H.*

BLANC (Georges) & BALTAZARD (M.). Réceptivité comparée du cobaye et de l'homme au virus du typhus murin. [**Comparative Susceptibility of Guineapig and Man to the Virus of Murine Typhus.**]—*C. R. Soc. Biol.* 1938. Vol. 128. No. 21. pp. 733–735.

The virus in the faeces of lice was utilized. It was found that this virus can be kept in the dried state for 4 months at least and can be accurately weighed and a series of comparative tests carried out.

It was found that the minimum infective dose for the guineapig was at least 100 times that for man. Six volunteers each received a dose of 0·01 mgm. of dried faeces ; 3 had a mild attack of fever, the other 3 developed immunity. A dose of 1 mgm. was necessary to infect guineapigs. *D. H.*

VIOLLE (H.). Expériences avec les virus du typhus exanthématique murin et de la fièvre boutonneuse. [**Experiments with the Viruses of Murine Typhus and Boutonneuse Fever.**]—*Bull. Soc. Path. Exot.* 1938. Apr. 6. Vol. 31. No. 4. pp. 263–265.

The author has already shown that young pigs can be infected by the ingestion of the virus of murine typhus. He now finds that the same is true of the virus of boutonneuse fever. The blood of the pigs was proved to be infective for rats and guineapigs, and a rash was noted on the pigs.

Blood of cases of endemic typhus was taken at the height of the fever. This was allowed to clot and rats were fed on the clot. These animals developed fever after an incubation period of 10 days. This virus was passaged through a series of rats and the virulence for rats was increased although no change in its action on guineapigs was noted. *D. H.*

ZWIERZ (J.). Recherches sur le typhus exanthématique chez les rats sauvages. [**Search for the Virus of Typhus in Wild Rats.**]—*C. R. Soc. Biol.* 1938. Vol. 127. No. 12. pp. 1141–1143.

Five hundred and sixty rats were captured some from districts where typhus was endemic and some from districts where typhus did not occur. In the first group the Weil-Felix reaction was positive in 16 per cent. whereas in the second group none was positive. A virus was isolated from rats captured in a village where cases of typhus had occurred. This virus was passaged in guineapigs ; these had fever but no orchitis ; 5 died. Those tested later were found to be immune to a strain of human typhus virus. *D. H.*

TRAVASSOS (J.). Procédé technique pour maintenir chez les rats le virus du " typhus exanthématique de São Paulo." [**Process for maintaining the Virus of São Paulo Typhus in White Rats.**]—*C. R. Soc. Biol.* 1938. Vol. 127. No. 5. pp. 460–461.

Three or four days after the infection of the rats 1 or 2 cc. of normal guineapig blood is injected into the peritoneum of the rat. Using this method it was found that the virus could be passed in series in rats up to the 14th passage. Up to the 10th the virulence was not reduced but after that falls off. No post-mortem signs were noted in the rats and no fever was produced nor could Rickettsia be demonstrated.

D. H.

VIOLLE (H.) & SAUTET (J.). Transmission du typhus murin par un hémiptère brésilien (*Triatoma infestans*). [**Transmission of Murine Typhus by *Triatoma infestans* from Brazil.**]—*C. R. Soc. Biol.* 1938. Vol. 127. No. 13. pp. 1276–1278.

Six of these bugs were fed on a rat which was infected with typhus (murine), 27 days later the insects were fed on a normal rat. They

were then crushed up and mixed with the feed and given to two other rats. Both rats had slight fever and were killed and emulsions of the brain inoculated into guineapigs. These had slight fever but nothing definite. A second series of experiments was carried out on the same lines. Rats which had ingested the bugs developed fever and emulsion of the brains infected guineapigs and they developed fever and orchitis. The bite of these bugs was not infective and the digestive route is the most easy and sure method of infection. *D. H.*

GEAR (J. H. S.) & DOUTHWAITE (M.). **The Dog Tick** *Haemaphysalis leachi* **as a Vector of Tick Typhus.**—*South African Med. Jl.* 1938. Jan 22. Vol. 12. No. 2. pp. 53–55. With 5 figs.

An adult tick *Haemaphysalis leachi* was removed from a dog belonging to a person who had suffered from tick typhus. This tick was crushed up and emulsified and injected intraperitoneally into a guineapig. This animal developed fever on the fourth day and at the same time a unilateral scrotal swelling; the animal was then killed and two other guineapigs inoculated, both developed fever and orchitis and Rickettsia were seen in smears from the tunica and surface of the spleen.

This strain of virus has now been passaged through several generations and it has been shown to be immunologically similar to the strain previously isolated from cases of the fever. The authors conclude that tick typhus is caused by a virus acquired from dog ticks, and that the dog tick *H. leachi* is the vector of tick typhus in South Africa. *D. H.*

GEAR (J. H. S.) & BECKER (L. H.). **A Case of Typhus Fever contracted in the Laboratory from a Virus isolated from Rats.**—*South African Med. Jl.* 1938. Jan. 22. Vol. 12. No. 2. pp. 57–60. With 2 figs. [15 refs.]

A typhus virus isolated originally from wild rats has been passaged in the laboratory in guineapigs for some considerable time and invariably produces fever and orchitis in these animals. During the course of his routine work a laboratory worker pricked himself with an infected needle in the forearm.

The incubation period was exactly one week, an inflammatory reaction was observed at the site of the needle wound and reached its maximum on the 3rd day. No enlarged glands could be detected at this stage and the small local reaction had faded by the 6th day, but reappeared with the commencement of the fever on the 7th day. This was in no sense a primary sore or *tache noire*, merely a small red and swollen area. Swelling and tenderness of axillary lymphatic glands was now present. Slight rigors were noted and the patient felt definitely ill with headache and muscular pains followed by a feeling of weakness and prostration. There was no involvement of the lungs, definite lowering of blood pressure was detected. The rash appeared on the 5th day of the fever and developed rapidly but not in crops and was profuse, involving the whole body, including palms and soles and consisted of fine discrete papules and macules and a few petechiae.

The temperature chart was continuous, the fever reaching 104°F. on the 2nd day and remaining at or about that level till it fell by crisis on the 13th day. Oscillating for 2 or 3 days, it finally fell to normal on the 16th day. Careful blood counts were carried out, there was a leucopenia involving all the white cells from the beginning of the fever.

The return to normal was noted on the 14th day. There was a slight relative increase of the polynuclear leucocytes.

Agglutinins for *Proteus OX19* appeared on the 10th day and reached a maximum on the 14th day in a dilution of 1/1600. *Proteus OX2* and *OXK* were not agglutinated.

Compared with tick bite fever the incubation period was similar, but the true primary sore was not observed although a primary reaction at the needle entry occurred.

The fever lasted longer than is the rule in tick bite fever and the illness was much more severe ; also *Proteus OX19* only was agglutinated.

D. H.

GRAY (J. D. Allan), PETERS (B. A.) & DAVIES (I. G.). **An Investigation of a Case of Typhus Fever.**—*Lancet.* 1938. Feb. 26. pp. 490–491. [11 refs.]

This patient, a man of 48, was suddenly taken ill (collapsed) on returning from his work in the sack warehouse of a flour and oil cake mill in Bristol on November 8th. He was admitted to hospital on November 14th and his case was most carefully and thoroughly investigated. Clinically the case was one of sporadic typhus with fever, rash in crops and later petechiae ; also pain in the muscles of the leg. Blood cultures were carried out but neither *Proteus* nor other bacteria could be isolated.

The Weil-Felix reaction showed marked positive agglutination for *Proteus OX19* and negative for *Proteus OXK*. There was no history of any other cases either in the patient's own family or among his fellow workers. The last case of typhus in Bristol was reported 10 years ago. Rats were captured near the mill and examined but no typhus virus could be isolated. [It would be interesting to know if the man had any food while at his work and whether contamination of this food by the urine of rats was a possibility ; see paper by LE CHUITON *et al.* above.]

D. H.

OLMER (D.) & OLMER (J.). Fièvre boutonneuse hivernale. [**A Case of Boutonneuse Fever which occurred in Winter.**]—*Bull. Soc. Path. Exot.* 1938. Apr. 6. Vol. 31. No. 4. pp. 265–266.

Practically all the cases of boutonneuse fever which have been reported in Marseilles and the neighbourhood occur during the summer months, April to September. However, the case recorded in this paper occurred in February 1938. The rash was typical and there was a definite *tache noire* on the cheek of the patient. The Weil-Felix reaction tested on the 10th day of the fever was negative. It is noted that the patient complained that the apartment in which he lived was over-heated.

D. H.

RAGIOT (Ch.), DELBOVE (P.), ALAIN (M.) & CANET (J.). Note au sujet des typhus dits " tropicaux " observés en Indochine méridionale. Caractères particuliers, place nosologique. [**A Note on the Subject of " Tropical Typhus " in Indo-China, its Particular Characteristics and Place in the Nosology.**]—*Bull. Soc. Path. Exot.* 1938. June 8. Vol. 31. No. 6. pp. 460–461.

There are two types of the fever met with in Indo-China : (1) met with in Europeans, planters or hunters ; symptoms, fever, pain in back,

insomnia, injection of conjunctivae, primary sore with inflamed glands and lymphatics, maculo-papular rash involving palms and soles; (2) met with in coolies employed in clearing scrub. Similar clinically but no rash or primary sore detected.

Both types occur in the rainy season in rural areas and in forest regions. In both types the Weil-Felix reaction is positive for *Proteus OXK* but negative for *OX19*. The disease is neither endemic typhus nor louse-borne typhus.

The viruses of the two types give identical reactions in guineapigs, severe infection often fatal, comparable to infection with Rocky Mountain fever virus or the virus of São Paulo fever. The authors are of opinion that these types of fever are identical on epidemiological, serological and experimental grounds. *D. H.*

RAYBAUD (A.). Tache noire et fièvre boutonneuse sans boutons. [**Boutonneuse Fever with Tache Noire but without the Rash.**]—*Marseille-Méd.* 1937. Nov. 5–15. Vol. 74. No. 31–32. pp. 431–434.

Three typical cases of fever with profuse rash and typical primary sore were noted. The wife of one of these patients developed fever on the same day as her husband. Two typical sores were noted but at no time could any rash be seen; a similar case had previously been seen by the author, but as this case was not associated with other cases it was not reported at the time. *D. H.*

GOURIOU (E.), MONDON (H.), MARÇON (H.) & LAHILLONNE (P.). Un cas de phlébite du membre inférieur au cours du typhus endémique bénin. [**A Case of Phlebitis of the Lower Limb in the Course of Endemic Typhus.**]—*Bull. Soc. Path. Exot.* 1938. May 11. Vol. 31. No. 5. pp. 335–336.

On the 20th day after the fever started and some days after the temperature had become normal phlebitis of veins of the left lower limb developed with swelling and pain, slight oedema and fever. Four months later the patient was discharged from hospital still with marked oedema of the limb. Six months later the condition still persisted.

So far as the authors are aware this is the first case of its kind so far published although a number of instances of this condition in boutonneuse fever have been reported. *D. H.*

VIOLLE (Henri). Contribution à l'étude des typhus exanthématiques endémiques. [**A Contribution to the Study of Endemic Typhus.**]—*C. R. Acad. Sci.* 1938. Jan. 31. Vol. 206. No. 5. pp. 382–383.

Two rickettsial diseases are met with on the coasts of the Mediterranean. The one, boutonneuse fever, carried by the dog tick, the other, ship typhus, carried by the rat flea. These two diseases clinically resemble one another closely although there are differences in the rash and the primary sore is present in most cases of boutonneuse fever, although not in all. As regards the Weil-Felix reaction in endemic typhus *Proteus OX19* is mainly agglutinated, whereas this occurs as a doubtful or group reaction in boutonneuse fever. Even cross immunity tests may fail at times to separate the two viruses. The author had in hand strains of the two viruses and carried out a

series of experiments with these on rabbits. He found that if rabbits are inoculated with the virus of boutonneuse fever this virus can be shown to be viable in the brains of these animals after 4½ months and in the blood up to 2 months. The same or similar results were obtained when the virus of endemic typhus was employed ; in neither case was there any fever or other symptom of infection in the rabbits. It was also found that pups could be infected with the virus of endemic typhus and rats with the virus of boutonneuse fever if the digestive route was employed. This might be described as a cross infection, since the dog is the reservoir of the virus of boutonneuse fever in nature and the rat the reservoir of the virus of endemic typhus. *D. H.*

LOGOTHETIS (E.), KASTANAKI (E.) & KASTANAKI (G.). Sur les méthodes biologiques du diagnostic de la fièvre exanthématique (fièvre boutonneuse, fièvre maculo-papuleuse). [**Biological Measures for the Diagnosis of Boutonneuse Fever.**]—*Bull. Soc. Path. Exot.* 1938. May 11. Vol. 31. No. 5. pp. 329–335.

The first part of this paper consists of a description of the disease and a history of the discovery of the vector.

A case was admitted to hospital under care of the authors. Weil-Felix positive 1/200. Blood from the patient was inoculated intraperitoneally into a guineapig. This animal developed fever and orchitis and a primary sore was noted at the point where the needle had penetrated the skin. The virus was passaged to several animals.

An emulsion of virus which had been heated for 30 minutes at 56°C. when injected into the skin of the patient produced no reaction but when injected into the shin of a normal person a reaction appeared. Emulsion of the brain of an infected guineapig mixed with the serum of the patient and injected into the skin of rabbits and guineapigs intradermally produced no results but when mixed with normal serum a reaction appeared.

Rickettsia were found in smears from the organs of guineapigs infected with the virus. Ticks were collected in the patient's house and from his dogs and emulsified and injected into guineapigs and fever resulted, whereas ticks collected from an adjoining house did not infect. *D. H.*

GIROUD (Paul). Essai de mise en évidence des anticorps du typhus exanthématique par un test cutané. [**A Skin Test in Typhus.**]—*C. R. Soc. Biol.* 1938. Vol. 127. No. 5. pp. 397–399.

The sera of cases or of persons who have recently recovered are taken and mixed with a definite dose of virus. This mixture is held for 30 minutes then injected into the skin on the inner side of the thigh of the rabbit. A mixture of normal human serum with the same dose of virus is injected into the other side. If the patient has, or has recently had, typhus the virus will be neutralized and no reaction will appear, whereas at the site of the injection of the virus and normal serum a marked reaction occurs.

This test can be used not only as an aid in diagnosis but also as a means of demonstrating the presence in the blood of antibodies for typhus. *D. H.*

GIROUD (Paul). Variations de la virulence des organes et des cultures du virus typhique murin mises en évidence dans la peau. [**Variation of Virulence of the Organs of Infected Animals and Cultures of Typhus Virus as evidenced by a Skin Reaction.**]—*C. R. Soc. Biol.* 1938. Vol. 127. No. 10. pp. 864–866.

This skin reaction can be used not only for the diagnosis of typhus but also for estimating the titre of antisera.

Emulsions of the organs of infected animals and cultures of typhus virus were kept at low temperatures and injected intradermally into the skin of rabbits. It was found that emulsion of tunica of infected guineapigs taken on the 6th day and injected produced a very definite nodule on the skin of the rabbit from the 4th to the 9th day after inoculation in dilutions of 1/250 to 1/2000. Emulsions of spleen brain or testicle taken at the same time did not produce any reaction even in a dilution of 1/25. The tunica apparently contains 10 times more virus than other organs.

Two strains of virus were tested, one from America and one from Morocco. These were found to be about equal as regards reaction in the skin. If the animals were given a diet lacking in Vitamin C the reaction was more marked. Cultures of virus do not give as marked reactions as do emulsions of passage virus. *D. H.*

GIROUD (Paul). Réaction provoquée par l'inoculation dermique du mélange de virus typhique exanthématique et de sérum d'individu ayant reçu un antigène de ce groupe. [**Reaction produced by the Intradermal Injection of a Mixture of Typhus Virus and of the Serum of an Individual who has received an Antigen of the Group.**]—*C. R. Soc. Biol.* 1938. Vol. 128. No. 17. pp. 249–252.

When the serum of people who have had typhus is mixed with typhus virus (murine) and injected intradermally no reaction appears ; but with normal serum there is a marked reaction.

One would expect that when the serum of individuals who have had injections of killed virus is mixed with living virus and injected the virus would be neutralized and no reaction appear, but on the contrary a more severe reaction results than that on the control side even.

The effect of the serum of people who have had inoculations is different from that of people who have had typhus, possibly the antibodies produced are different and there is a sensitization.

D. H.

GIROUD (P.). Les anticorps des infections exanthématiques. Le test de séro-protection cutanée locale. [**Estimation of the Antibodies in the Blood in Cases of Typhus Fever by Means of a Skin Test.**]—*Bull. Soc. Path. Exot.* 1938. Apr. 6. Vol. 31. No. 4. pp. 245–252. With 5 figs. [11 refs.]

The method employed is that varying doses of infective material (emulsion of tunica of infected guineapig) are mixed with the serum under test and kept at room temperature for 15 minutes then injected into the skin of guineapigs or rabbits (white preferred). The viruses used in these trials were murine virus (Zinsser) and murine virus Tunis No. 1. It was found that even 1/2000 of the emulsion of an infected tunica would give a reaction in the skin in rabbits. The sera of typhus cases, also convalescent sera and the sera of people who had

had typhus some years previously, were tested and it was found that these sera neutralized the virus and no reaction appeared, whereas controls in which the virus was diluted with normal saline or normal serum gave a marked reaction. This reaction appeared on the 4th day in the form of erythematous nodules going on in some cases to necrosis. It is proposed to utilize this method for the diagnosis of cases of typhus and for the detection of immunity in vaccinated persons. *D. H.*

OCHI (Sadami). **A Method for staining Rickettsia in Sections.**—*Jl. Lab. & Clin. Med.* 1938. May. Vol. 23. No. 8. pp. 852–856. With 2 figs.

The author considers that when studying Rickettsia in experimental animals sections of tissue, as well as smears, should always be employed.

He recommends his method for staining trachoma, as follows :—

Fixatives. Schaudinn's sublimate alcohol
or 1 per cent. formalin in distilled water.
Embed in paraffin.

Staining solution.	Kresylechtviolet (Grübler)	0·5
	Glycerin	10·0
	5 per cent. carbolic	90·0
	Distilled water	100·0

For sublimate alcohol sections.
For formalin fixed sections the distilled water is omitted.

The sections are stained section side down for 20 minutes. Sections are then first washed in distilled water, then in 5 per cent. acetic acid water for 1 minute, sections are then dried, cleared in anilin xylol, then xylol and mounted in neutral Canada balsam. In stained sections Rickettsia within the cells can be clearly seen, also any pathological changes in the tissues can be observed. *D. H.*

GIROUD (Paul) & TANNENBAUM (Simon). Le comportement du cobaye typhique exanthématique vis-à-vis de la réaction de Weil et Felix peut-il éclairer la pathogénie de cette réaction ? [**Weil-Felix Reaction in Guineapigs infected with Typhus.**]—*Arch. Inst. Pasteur de Tunis.* 1937. Dec. Vol. 26. No. 4. pp. 671–675.

It is well known that in guineapigs infected with typhus the Weil-Felix reaction is negative, whereas in man, monkeys and rabbits the reaction is positive.

During typhus fever passage of bacteria takes place from the intestine to the blood and lymph streams and *Proteus* has been frequently isolated from the blood in typhus fever and also in fevers other than typhus. The authors have made careful surveys of the bacterial flora of the intestine of guineapigs and have failed to find *Proteus*.

The following experiments were carried out. Six guineapigs were fed on *Bact. coli* by mouth and per rectum and were then infected with typhus ; the Weil-Felix reaction did not become positive. Ten guineapigs were fed on *Proteus* but not infected with typhus ; the Weil-Felix reaction remained negative. Eight guineapigs were fed on *Proteus* and were infected with various strains of typhus virus. All gave a positive Weil-Felix reaction for *Proteus OX19* and *OXL* but did not agglutinate *Proteus OX2* or *OXK*. If the typhus infection

was delayed till the *Proteus* bacilli had disappeared from the intestine of the guineapigs the reaction did not become positive. If there are no *Proteus* in the intestine there can be no passage of this bacillus into the blood and no positive Weil-Felix reaction.

In the opinion of the authors the Weil-Felix reaction is not due to an immunological relation between *Proteus X* and Rickettsia but is a secondary reaction due to invasion of the circulation by a commensal germ. *D. H.*

GAUD. La vaccination contre le typhus par la méthode de G. Blanc au cours de l'épidémie de 1937 au Maroc. [**Vaccination against Typhus by the Method of G. Blanc in the Course of the Epidemic of 1937 in Morocco.**]—*Bull. Office Internat. d'Hyg. Publique.* 1938. Feb. Vol. 30. No. 2. pp. 298–307. With 3 charts and 1 map.

In Morocco there was a big epidemic of typhus in 1927 and 1928, but since then only a few cases have occurred each year until 1937.

Year	Cases	Year	Cases
1927	1,659	1932	256
1928	4,132	1933	451
1929	147	1934	303
1930	170	1935	431
1931	403	1936	173

In 1937 the economic situation in N. Africa was grave and many cases of typhus were reported from Tunis and Algeria. The epidemic in Morocco commenced in March and by the middle of May when it reached its peak 100 cases were reported in a week. There were three principal foci of the disease, one rural in Marakeesh and two in the cities of Fez and Casablanca. Most of these cases occurred among the refugees from the countryside where crops had failed. All the people were starving and lice infested. Some 50,000 people were vaccinated at the market town of Rehamna situated at the junction of two great caravan routes.

In Fez some 3,000 people were vaccinated, including 800 in an institution where the refugees were lodged and where typhus had broken out. No further cases occurred among them.

In Casablanca, where there was a native population of nearly 200,000, 136,000 were vaccinated in one month and all voluntarily. Seventy cases were reported on 15th May and none after 29th June. No severe reactions were noted or reported among the vaccinated. Slight fever 1 to 3 days was noted in a few of the Europeans inoculated. *D. H.*

RADLO (Pierre). Observations sur la vaccination contre le typhus exanthématique par le vaccin de Weigl. [**Observations on Vaccination against Typhus by Weigl Vaccine.**]—*Arch. Inst. Pasteur de Tunis.* 1937. Dec. Vol. 26. No. 4. pp. 667–670.

This vaccine is a killed vaccine and has been in great demand recently. It is difficult to prepare in large quantities, as it entails lice breeding on a large scale, inoculation and dissection of lice, etc.

At present in the Institute at Lwow it is possible to prepare only about 2,000 doses in a month, the numbers of lice intestines per dose has been reduced from 250 to 150 and now to about 90 per person, this amount being given in 2 or 3 doses.

In the four years 1933–36, experiments were carried out near Lwow, when nearly 14,000 persons were inoculated. It has been estimated that in infected lice there will be from 10 million to 100 million Rickettsia in the intestines. The mixture of these intestines will give on the average 5,000,000,000 Rickettsia in a dose of 90 intestines. This would be given in three doses. In the trials of the 14,000 vaccinated

One-quarter	received	contents of	1 to 10	intestines.	
One-half	,,	,,	,, 10 ,, 20	,,	
One-quarter	,,	,,	,, 20 ,, 90	,,	

No difference so far as protection was concerned was noted between those receiving the large dose and those receiving the smaller doses. Also it is not necessary to inoculate the entire population to check an epidemic ; 30 per cent. is sufficient and these should receive contents of 10 to 20 intestines in three doses. *D. H.*

LAIGRET (Jean), DURAND (Roger), BELFORT (Joseph) & LEFAUCHEUR (Jean). La vaccination contre le typhus exanthématique en Tunisie. [**Vaccination against Typhus in Tunisia.**]—*Bull. Office Internat. d'Hyg. Publique.* 1938. Feb. Vol. 30. No. 2. pp. 308–316.

A living vaccine was used, the endemic typhus virus being dried and suspended in yolk of egg and finally in olive oil. Approximately 1/200 of the brain of an infected rat is injected in each dose.

The present investigation deals with the results obtained in the 30,000 people who had been inoculated in the previous year (1936). These people were mostly in the areas where typhus existed. Three cases of definite "vaccinal typhus" occurred among these people. These were all Europeans, no case occurred among the vaccinated Arabs. Three cases of true typhus occurred among these 30,000 vaccinated people, more than one month after vaccination ; there were no deaths. There have been no further cases in the vaccinated during 1937 and cases that have occurred in partially protected villages have all been in the unvaccinated. The three chief points in the campaign are isolation of the sick, lousing of contacts and above all but in combination with the two first—vaccination. The great advantage of vaccination is that quarantine can be reduced or eliminated, markets can be held and people can continue or resume their work. [See also *Bulletin of Hygiene*, 1938, Vol. 13, p. 712.] *D. H.*

SPARROW (Hélène) & MARESCHAL (P.). Essais d'immunisation de l'homme par voie oculaire avec les rickettsies du virus murin I de Tunis. [**Attempts to immunize Men by the Virus of Rat Typhus No. 1 of Tunis by the Ocular Route.**]—*Bull. Acad. Méd.* 1938. Jan. 25. 102nd Year. 3rd Ser. Vol. 119. No. 4. pp. 140–145. With 6 figs.

The opportunity was taken for this work during the treatment of cases of dementia praecox by fever therapy.

The authors have already noted that if guineapigs are inoculated with this virus by the peritoneal route a severe infection results, whereas if the virus is instilled on the conjunctiva the infection is inapparent, yet immunity follows. Lice were inoculated according to the Weigl technique and emulsion made of infected intestines containing numerous Rickettsia. One drop was placed on the conjunctiva of the patient. Five men in all were inoculated, all developed fever after an incubation of exactly 15 days. The fever was mild, there was no rash and no other symptoms; the Weil-Felix reaction became positive early and gave reactions up to 1/10,000. These five men were re-tested later. All proved to be immune. One control not previously inoculated developed a mild fever after an incubation period of 18 days. *D. H.*

KLIGLER (I. J.) & LEVINE (Sonia). **Immunization of Monkeys and Humans with Formolized Tissue Cultures of Typhus Rickettsia.** —*Trans. Roy. Soc. Trop. Med. & Hyg.* 1938. June 25. Vol. 32. No. 1. pp. 93–98. With 1 graph.

Two-week-old cultures were employed in these experiments and the triturated tissue was suspended in saline solution instead of the original culture fluid. Three injections, 0·5 cc. of the formolized cultures, were given at intervals of three days to monkeys and the animals were tested two weeks later by injections of living virus. Ten monkeys were injected and when tested later only two of these had slight fever, two controls on the other hand developed typical temperatures. The monkeys showed a rise in the Weil-Felix reaction after vaccination but there was no response on the injection of living virus.

Six laboratory workers were vaccinated with killed cultures. Two of these showed a marked positive Weil-Felix reaction before vaccination, these two had been employed in handling typhus material for some years in the laboratory. The other four developed a positive reaction after vaccination. Apart from a mild local induration and reddening no discomfort was experienced and there was no rise in temperature. *D. H.*

WEIGL (R.). La sérovaccination de l'homme contre le typhus. [**Serovaccination of Man against Typhus.**]—*Arch. Inst. Pasteur de Tunis.* 1937. Dec. Vol. 26. No. 4. pp. 665–666.

The serum of convalescents if mixed with virus can prevent infection in experimental animals. Vaccines given during the incubation period of typhus do not prevent the development of the fever. If the serum of convalescents is given during the incubation period fever is prevented and immunity due to the vaccine has time to develop. Contacts may be protected in the same way. As convalescent serum may be difficult to obtain the author suggests the use of the serum of recently vaccinated people. Experimentally these sera are as good or better for the purpose than convalescent sera. *D. H.*

BALTAZARD (M.). Etude d'un sero-test d'immunité dans les fièvres exanthématiques. [**A Study of a Serological Test for Immunity in Typhus Fevers.**]—*Bull. Soc. Path. Exot.* 1938. Mar. 9. Vol. 31. No. 3. pp. 186–192. With 1 chart. [17 refs.]

A review of previous work is first given, and it has been shown by NICOLLE that the serum of persons recovered from typhus when mixed

with virus prevented the infection of experimental animals as did the serum if injected before the virus.

The author has already published work which showed that the inoculation of the viruses of murine typhus and of boutonneuse fever into the skin of rabbits and guineapigs produces a local reaction which appears in 48 hours; he also showed that if the virus is first treated with bile no reaction results, whereas the virus alone injected at the same time on the other side produces the typical reaction. Emulsion of the spleen of infected guineapigs was used and definite doses of this were mixed with varying amounts of serum. These mixtures were kept at room temperature for 15 minutes and then inoculated into the left flank of guineapigs, while into the right flank the same dose of virus without serum was inoculated. The two reactions were then compared and contrasted.

The reactions were uniform on the control side and varied on the other side according to the amount of immune serum employed. Without the controls with which to compare the test serum it is difficult to read the results owing to the differing susceptibility of guineapigs.

As the viruses of Rocky Mountain fever and of typhus do not produce a local reaction in the skin of animals the sera of persons with Rocky Mountain fever can be tested with the virus of boutonneuse fever and the sera of typhus fever patients tested with the virus of murine typhus. Employing these methods of testing it is possible to determine:

1. The date at which antibodies appear in the serum of persons suffering from typhus, murine typhus, Rocky Mountain fever and boutonneuse fever.
2. Duration of antibodies in the serum of patients and infected animals.
3. The length of time antibodies remain active in serum *in vitro*.
4. Detection of antibodies in inapparent infections in man and animals.
5. Variations in antibodies in vaccinated people due to reinoculation.

Résumé.—The serum of men or animals cured of typhus or murine typhus prevents the local reaction produced by the murine virus.

The serum of men or animals recovered from boutonneuse fever or Rocky Mountain fever prevents the local reaction produced by boutonneuse virus. Further research is proposed on these lines.

A Discussion followed. M. GIROUD (see above) pointed out that this work confirms his own findings. *D. H.*

GIROUD (Paul). La sensibilité cutanée locale vis-à-vis d'un virus typhique murin est inversement proportionnelle à la réceptivité générale de l'organisme. [**The Local Skin Reaction to the Virus of Murine Typhus is inversely proportional to the General Susceptibility.**]—*C. R. Soc. Biol.* 1938. Vol. 128. No. 20. pp. 590–591.

Mice when inoculated intraperitoneally with the virus develop high fever and nearly all die, yet the local reaction is nil.

White rats have fever but not so severe though some may die, but these also do not develop a local reaction in the skin. Guineapigs have a still milder fever and do not die of the infection but develop a definite local reaction.

Rabbits have only an inapparent infection when inoculated intraperitoneally but show a marked local reaction when inoculated intradermally. *D. H.*

CASTANEDA (M. Ruiz) & VARGAS-CURIEL (J.). **Response in the Horse to Mexican Typhus Infection.**—*Jl. Immunology.* 1938. July. Vol. 35. No. 1. pp. 47–54. With 2 figs.

With a view to obtaining a potent antiserum horses were inoculated with living virus. These animals developed fever, depression, refusal of food and loss of weight. Although it was not possible to isolate the virus from the blood the authors are of opinion that the animals were infected; they developed a positive Weil-Felix reaction and a second injection of the living virus in the same animals elicited no response. The result of protection experiments with the serum of these animals was disappointing but it is now proposed to super-immunize the animals by intensive intravenous treatment with heavy suspensions of formalinized Rickettsiae. *D. H.*

TRAVASSOS (J.). Comportement du rat blanc aux inoculations expérimentales sériées du virus du "typhus exanthématique de São Paulo." [**Effects of the Inoculation of the Virus of São Paulo Typhus in the White Rat.**]—*C. R. Soc. Biol.* 1938. Vol. 127. No. 5. pp. 457–459.

The virus was passed in series from rat to rat; 5 series were used and a total of 150 rats were inoculated. No fever was noted in any of the rats nor were any signs of infection such as orchitis or enlarged spleen seen at post-mortem examination, no Rickettsia could be discovered in smears from the peritoneum or tunica. The Weil-Felix reaction was negative in most; in spite of this it could be shown that the virus multiplied in the blood of the rats; blood taken on the 10th day after the inoculation infected guineapigs but from the 2nd series rats only mild infections were produced and the virus could not be isolated from the rats in the 4th series. A few of the guineapigs infected from the 3rd series rats had slight fever but were not immune to reinfection. White rats are strongly resistant to the virus of São Paulo typhus and passage through these animals reduces the virulence for guineapigs. *D. H.*

TRAVASSOS (J.). Etudes expérimentales sur la transmission du "typhus exanthématique de São Paulo" par l'*Amblyomma striatum* Koch, 1844. [**Transmission of the Virus of São Paulo Typhus by the Dog Tick** *Amblyomma striatum* (**Koch**).]—*C. R. Soc. Biol.* 1938. Vol. 127. No. 5. pp. 462–464.

Adult ticks were collected from dogs and were fed on infected guineapigs and also on normal guineapigs to exclude previous infection. Batches of these ticks were fed for periods of 6 hours up to 6 days; after 8 days they were then fed on normal guineapigs and some were crushed up and injected into the animals. Numerous positive results were obtained. These were confirmed by the reactions in the guineapig and the production of positive Weil-Felix reaction in rabbits. Larvae obtained from some of the female ticks were fed on infected rabbits. The larvae became infective and also nymphs and

adults which developed from these larvae. Female ticks were fed on infected rabbits and the eggs collected. These eggs were emulsified and injected into normal guineapigs which became infected. *D. H.*

TRAVASSOS (J.). La tique *Amblyomma striatum* Koch, 1844, comme vecteur du "typhus exanthématique de São Paulo." Infection naturelle en spécimens recueillis sur des chiens, dans un foyer de la capitale (São Paulo). [**The Tick** *A. striatum* **Koch 1844 as a Vector of São Paulo Typhus. Natural Infection in Specimens collected from Dogs in a District of São Paulo.**]—*C. R. Soc. Biol.* 1938. Vol. 127. No. 13. pp. 1377–1380.

Ticks of the species *Amblyomma striatum* were collected from dogs in a district of the city where cases of typhus had recently occurred. Two series of experiments were carried out and showed that dog ticks were naturally infected and were capable of transmitting the virus by their bite to susceptible animals, and probably also to man. Animals infected with the virus derived from the ticks were immune to the virus from cases of São Paulo typhus and *vice versa*. *D. H.*

TRAVASSOS (J.). Transmission expérimentale du "typhus exanthématique de São Paulo" par l'*Amblyomma brasiliense* Aragao, 1908. [**Experimental Transmission of São Paulo Typhus by the Tick** *Amblyomma brasiliense* **Aragao, 1908.**]—*C. R. Soc. Biol.* 1938. Vol. 127. No. 13. pp. 1375–1376.

Specimens of ticks were collected from their natural hosts in the bush, tapirs and peccaries. The nymphs of these ticks were then fed on guineapigs infected with São Paulo typhus; they were then removed and placed in tubes where they moulted; the adult ticks were taken and fed on normal guineapigs and rabbits. After the usual incubation period these became infected and the virus was passaged in guineapigs with typical symptoms. The blood of the rabbits was shown to be infective and gave a positive Weil-Felix reaction. These ticks are easily infected with the virus and readily infect experimental animals. *D. H.*

NOURY (M.). Blocage et infections typhiques. [**Results on Typhus Infection of blocking the Reticulo-Endothelial System with Colloids.**]—*Bull. Soc. Path. Exot.* 1938. Feb. 9. Vol. 31. No. 2. pp. 90–92.

These experiments were carried out on guineapigs with three strains of virus: (1) Historic typhus; (2) Endemic typhus; (3) Boutonneuse fever.

As regards typhus virus it was found that the blocking of the system lowered the resistance of the animals and the infection was more severe and lasting than usual. But as regards the other two viruses the results were unexpected. If the inoculation of the virus is done before the injection of the colloid (blocage) the results are similar to the above (lowered resistance) but if the blocking is done first an inapparent infection only results and the animals are resistant to further infection. *D. H.*

APPEL. Note concernant la lutte contre le typhus dans le Département de Constantine. [**Note concerning the Prevention of Typhus in the Department of Constantine.**]—*Rev. Méd. et Hyg. Trop.* 1938. Jan.–Feb. Vol. 30. No. 1. pp. 23–31.

The author's contention is that the regulations for the control of typhus in the Department are excellent but do not work out successfully in practice and he makes suggestions for improvements. As regards notification of outbreaks rules are laid down for this but these rules are often neglected or ignored by the civil authorities, due partly to laziness and partly because these people resent interference from the sanitary department which follows discovery of the disease. He suggests that notification should be carried out by trained inspectors suitably clad and who can be bathed and loused daily ; such people should be well remunerated. Under the present system outbreaks sometimes assume quite large proportions before notification reaches the medical authorities.

As regards disinfection and delousing the regulations also are good but often difficult to carry out in practice. For instance, steam disinfection and baths and sprays are recommended but cannot be employed, due to lack of water and accommodation on the spot. Also the women cannot be dealt with unless women doctors and attendants are appointed.

The poorer people have only one garment ; therefore, in winter at least, it is necessary to carry a reserve of clothing for people to wear while their own garment is being fumigated. As regards disinfection of huts and furniture " Flit " is preferred to the lime wash at present used.

Isolation of cases and contacts is necessary but as at present carried out is not strict and friends and relations freely mix with the sick and other contacts. Contacts who are supposed to be isolated are found visiting the villages or move about from house to house. The isolation must be strict and for this purpose sectional wooden huts are suggested. These can be carried on lorries and erected where desired, these also could be used for spraying and bathing where water is available. Special zinc lined carts should be provided for transport of sick to such huts, such carts can be easily disinfected with sulphur. *D. H.*

CHI (Ta-Chih) & SU (Der-Long). **Delousing in Refugee Camps.**—*Chinese Med. Jl.* 1938. Mar. Vol. 53. No. 3. pp. 271–277. With 10 figs.

Two methods were employed.

1. Ironing and spraying clothes with a mixture of cresol, naphthalene and crude oil.
2. Hot air delouser, a wooden box.

The first method was found to take too long and required too much labour. The hot air delouser is preferred ; this is a wooden box 5 ft. square with a perforated iron sheet as the base under which braziers are placed. The top consists of loose boards and clothes are put in through this. A temperature of 83°C. can be obtained in 15 minutes. Lice and nits are killed in 20 minutes and one squad with two delousers can deal with 1,000 to 1,500 garments in one day. *D. H.*

JOYEUX (Ch.). Typhus et fièvres exanthématiques. [**Typhus and Typhus-like Fevers.**]—*Marseille-Méd.* 1937. Sept. 25. Vol. 74. No. 27. pp. 251–260.

A general review of the subject. *D. H.*

HAMPTON (Brock C.) & EUBANK (Harry G.). **Rocky Mountain Spotted Fever. Geographical and Seasonal Prevalence, Case Fatality, and Preventive Measures.**—*Public Health Rep.* Wash. 1938. June 17. Vol. 53. No. 24. pp. 984–990. With 1 fig.

The disease is discussed from the clinical, geographical and seasonal aspects, the latter depending of course on the presence of the tick vectors. Full tables are given from the records in the statistical departments. It is interesting to note that when the fatality rates for the five years 1933–37 are analysed, the number of deaths per 100 cases in the north-western States is 19·4 and the south-eastern States 18·1. In previous years the fatality rate in the western States was much higher; the authors consider that the fall in the rate is due to the extensive use in recent years of the preventive vaccine. This vaccine has not been used so far in the eastern States. *D. H.*

PARKER (R. R.). **Rocky Mountain Spotted Fever.**—*Jl. Amer. Med. Assoc.* 1938. Apr. 9 & 16. Vol. 110. Nos. 15 & 16. pp. 1185–1188; 1273–1278.

A résumé of present-day knowledge of the disease read before the first Rocky Mountain Medical Conference at Denver on July 21st, 1937.

The data are presented under four sectional headings: (1) Ticks concerned in the maintenance and transmission of the virus; (2) the virus and the disease in nature; (3) the disease in man; (4) Prophylaxis.

The various papers by the author and by others on which this résumé is founded have been already summarized in this *Bulletin*; those specially interested in Rocky Mountain spotted fever should consult this detailed and complete account. As regards the vexed question of the spread of spotted fever from west to east, the author points out that cases of spotted fever in the eastern States carried by the American dog tick *D. variabilis* are most numerous in eastern coastal areas, becoming fewer and fewer the further west one goes; then comes an area where no cases have so far been discovered, and further west districts in which true Rocky Mountain fever cases carried by the American wood tick *D. andersoni* are found; these cases become more numerous to the west and north. In all these areas including the districts where the disease in man has not yet been discovered, a mild type of the virus can be isolated from the common rabbit tick *H. leporis palustris*; this tick does not bite man.

This geographical distribution of the disease is against the view that the virus has been in recent years carried from west to east, as is also the fact that cases are not found along the great trade routes and railroads which run across the Continent. It appears more likely that cases have been occurring in the eastern and central States for many years but have not been detected till a few years ago. *D. H.*

HEALTH NEWS. New York. 1937. Oct. 25. Vol. 14. No. 43. pp. 175–176. **Cases of Rocky Mountain Spotted Fever found on Long Island.** [Summary taken from *Public Health Engineering Abstr.* Wash. 1938. Apr. 2. Vol. 18. Signed Earnest BOYCE.]

Rocky Mountain spotted fever is now recognized in various parts of the country. This article refers to cases occurring in the eastern part of Long Island from 1926–30, 1934, and to report published in September, 1935 Journal A.P.H.A. Subsequent to this report four additional cases have occurred in this district, with a record of tick bites in two cases. One fatal case. Blood specimens from all cases agglutinated B. proteus X19 in high dilution. Seasonal distribution of cases—all late spring or summer.

DIAS (Emmanuel). Depositarios naturaes e transmissores da febre *Maculosa brasileira.* [**Natural Hosts and Vectors of the Spotted Fever of Brazil.**]—*Brasil-Medico.* 1938. Mar. 12. Vol. 52. No. 11. pp. 269–272. [26 refs.]

Brazilian spotted fever includes Rocky Mountain spotted fever and the São Paulo and Minas Geraes types of endemic typhus. Natural (reservoir) hosts were stated by MOREIRA and MAGALHÃES in 1937 to be six in number: the opossum, *Didelphis marsupialis*; the dog, *Canis familiaris*; also *C. brasiliensis*; the wild rabbit, *Silvilagus minensis*; the *Cavia aperea* and *Dasyprocta agouti*. TRAVASSOS later the same year noted a natural infection in *Didelphis aurita* and *D. paraguayensis*. From the human aspect the dog is the chief natural host.

As for vectors several genera of ticks have been incriminated. The most important are species of *Amblyomma, viz., A. cajennense* (the chief vector for man) and *A. striatum. A. brasiliense* often bites man, but it is a natural parasite of wild pig, capybara and tapir, which are not known to harbour the virus of spotted fever. Other species of *Amblyomma* may possibly act as vectors, but are not proved to do so.

Rhipicephalus sanguineus plays a large part in dissemination of the infection among dogs and may accidentally infect man. *Ixodes*, especially *I. loricatus, Haemaphysalis leporis palustris* and *Dermacentor andersoni* are transmitters to animals but are not found in Brazil.

H. H. S.

CAREY (Lawrence S.) & DUNCAN (Garfield G.). **Rocky Mountain Spotted Fever in the East. Report of a Case.**—*Jl. Amer. Med. Assoc.* 1938. Jan. 15. Vol. 110. No. 3. pp. 175–177. [15 refs.]

This paper opens with a review of the subject of Rocky Mountain spotted fever generally and specially as it affects the eastern States. The authors point out that this fever was unknown in the East a few years ago. The epidemiology is discussed and the clinical features described. It is noted that the mortality of the disease in the eastern States is much lower than in the original home of the disease in the western States and specially in certain valleys of the Rockies.

The case described was that of a youth aged 16 who went out on a shooting trip; he gave a history of picking off ticks from his dog and crushing them in his fingers.

The fever was high with delirium and a profuse macular rash which appeared first on the limbs, then the chest and spread all over the body. There was a well marked leucocytosis and the Weil-Felix reaction was positive for *Proteus OX19* in a dilution of 1/160. The patient recovered and made a rapid convalescence. *D. H.*

DENGUE AND SANDFLY FEVER.

BOCTOR (Kornolios). **A Clinical Study of the Present Dengue Epidemic.** —*Jl. Egyptian Public Health Assoc.* 1938. Jan. 13th Year. pp. 2–16. With 4 coloured figs. on 2 plates & 15 charts.

A detailed study based on several hundred cases admitted to the hospital in Cairo.

Fever and headache were the two constant symptoms and the only symptoms in a large number of the cases. Muscular pains came next in order of frequency also joint pains, but these were often not recorded. Injection of the conjunctivae was observed in the majority. Numerous temperature charts are shown, the types being continuous, saddle back and ascending or descending. Redness of the skin, primary rash, was noted in a number of cases and also a later terminal or secondary measly rash. But as already stated a large number of the cases showed neither rash or saddle back chart nor complained of pains.

D. Harvey.

O'MEARA (F. J.). **"Sellar Fever."** [Correspondence.]—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1938. Mar. 17. Vol. 31. No. 5. pp. 571–572.

The writer considers that "Sellar fever" is likely to be confused with dengue which is also a saddle fever; in fact [one gathers] he considers that this confusion has already occurred. That is that sellar fever is really dengue [see this *Bulletin*, 1938, Vol. 35, p. 377].

D. H.

PAPANDONAKIS (E.) & AVRILIONIS (D.). Remarques sur une épidémie de fièvre de trois jours. [**Remarks on an Outbreak of Three-Day Fever.**]—*Arch. d'Hygiène.* Athens. 1938. May. Vol. 2. No. 5. [In Greek pp. 131–132. With 5 charts. French summary p. 163.]

In Crete in May 1937 a hundred cases of an acute fever were reported. In addition to the fever lasting 4 to 5 days, general malaise, frontal headache and slow pulse were noted. No malarial parasites could be seen in the blood. Of the insects captured in the rooms of the sick, 98 per cent. were *Phlebotomus* (80 per cent. of these were *pappatasii*), the remaining 2 per cent. were mosquitoes. *D. H.*

MOCHKOVSKI (Sh. D.), DIOMINA (N. A.), MALAKHOV (B. J.), PAVLOVA (E. A.) & LIVSCHITZ (J. M.). Recherches sur la fièvre pappataci. Mémoire VII. Expérience de l'immunisation préventive contre la fièvre pappataci. [**Results of Immunization against Pappataci Fever.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1937. Vol. 6. No. 6. [In Russian pp. 910–920. With 5 figs. French summary p. 921.]

The method used was to inoculate with serum taken from a case of the fever followed by 3 cc. of immune serum ; a few cases of reaction followed ; a later method was to use mixtures of serum and immune serum and to inject this. The resulting immunity was similar to that following an attack of the fever.

This method has resulted in a considerable reduction in incidence in 500 people who were treated, as compared with a control group uninoculated. *D. H.*

MALARIA.

SOUTHERN MEDICAL JOURNAL. 1938. Aug. Vol. 31. No. 8. pp. 933–949.—**Symposium on Malaria—Part 2.** [5 papers.]

This contains papers from the National Malaria Committee which held a conference jointly with the Southern Medical Association at New Orleans in November and December 1937. It is the second instalment of the report, papers from the first instalment of which are abstracted below [see pp. 805, 811 & 812]. In it are summarized papers dealing with recent research on medical prophylaxis and treatment of malaria, advances in the epidemiology of the disease, recent additions to knowledge of immunity and research on the plasmodia. The first part also contains a summary of methods of mosquito control. These papers are not suitable for further abstracting, but contain well arranged information useful to all workers in that they summarize present knowledge, though containing no fresh information. The fifth paper, on *Pl. knowlesi* in general paresis, will be abstracted in the *Bulletin of Hygiene*, as it is of greater interest to those engaged in the use of malaria as a therapeutic measure in parasyphilis than to the tropical practitioner. *C. W.*

DOGRA (J. R.). **A Malaria Survey of Bannu Cantonment (1932–33).**—*Jl. Malaria Inst. of India* (formerly *Records of the Malaria Survey of India*). 1938. Mar. Vol. 1. No. 1. pp. 57–81. With 3 maps, 1 fig., 3 plates & 2 graphs.

This is a very detailed description of the topography of Bannu and its surroundings with special reference to conditions responsible for the relatively high prevalence of malaria in that cantonment. Numerous irrigation channels are responsible for the prevalence of *A. stephensi*, *A. culicifacies* and *A. subpictus*, the two former of which are the chief vectors. Even if mosquito breeding within cantonment limits could be abolished the extensive breeding that takes place immediately outside its boundary would constitute a danger that is difficult to deal with. The malaria season is well marked : it begins toward the end of August. Cases are most numerous in October and November after which there is a rapid decline in prevalence. *Norman White.*

SCHWETZ (J.) & GERONNEZ (E.). Sur le paludisme endémique du Bas-Congo. I. Le paludisme chez les noirs du Mayumbe. II. Le paludisme chez les noirs de la région côtière et des criques. III. Le paludisme chez les noirs de l'agglomération de Boma (Bas-Fleuve). [**Malaria among the Natives of (1) Mayumbe, (2) Region of Coast and Creeks, and (3) Boma (on the Lower River).**]—*Ann. Soc. Belge de Méd. Trop.* 1938. Mar. 31. Vol. 18. No. 1. pp. 115–120 ; 121–126 ; 127–132.

These papers summarize the results of the examination of a large number of blood films taken from natives of all ages, but especially children, in several districts of Western Congo. In Mayumbe, which lies to the north of the lower reaches of the Congo, malaria is intensely prevalent. Infections become apparent a few weeks after birth and are almost universal at six months of age. After the fifth year there is a gradual decrease in the parasite index. *Pl. falciparum* is much the

most prevalent, *malariae* coming next, and lastly *vivax*. *Pl. vivax* disappears the first ; then *malariae*. *Pl. falciparum* infections, though diminishing in number with advancing age, can be found at all ages. Gametocytes are subject to the same progression-regression. Infections in children are very intense. Anophelines are numerous and prominent among them is *A. funestus*.

The coastal region bordering the Atlantic to the north of the mouth of the Congo is not far distant from Mayumbe but the conditions are very different. The wooded hills of Mayumbe are replaced by grassy plateaux. In the coastal region anophelines are not numerous and are almost exclusively *costalis*. Malarial incidence is much less severe. Though the appearance of infection, its progression and regression, are similar, parasite indices are lower and gametocyte carriers are fewer in number. The infected harbour far fewer parasites. *Pl. malariae* is much less in evidence and *Pl. vivax* is either rare or absent.

In Boma, which is on the Lower Congo, malarial conditions resemble those of Mayumbe rather than those of the coastal plain but the intensity of infections is less. In Boma the most prevalent anopheline is *gambiae* ; *funestus*, *nili*, and occasionally *pharoensis*, are also found.

N. W.

ROOT (Francis M.) & ANDREWS (Justin). **Malaria and Anopheline Survey of Grenada, B.W.I.**—*Amer. Jl. Hyg.* 1938. May. Vol. 27. No. 3. pp. 549–579. With 1 fig. & 5 maps. [15 refs.]

The survey, the results of which are recorded in this paper, was carried out as long ago as July and August, 1929. Dr. Root died in 1934. More recent surveys of malaria in Grenada have been made, the results of which have been published (see EARLE, W. C., this *Bulletin*, 1937, Vol. 34, p. 140).

In 1929 the incidence of malaria in Grenada was not high ; the parasite and spleen indices for the 6,000 persons examined (total population of the Island 75,000) were 5·1 per cent. and 12·3 per cent. respectively. Malaria was more or less confined to the coastal belt and to altitudes below 500 feet. The spleen index alone was not a reliable index of malaria prevalence. In certain parts of the Island, notably at Victoria on the north-west coast, there appeared to be other causes than malaria of splenomegaly. The three most prevalent species of anophelines were *pseudopunctipennis*, *argyritarsis* and *tarsimaculatus*. The distribution of the breeding places of the last named species corresponded closely with the distribution of malaria ; the other two species were found in abundance where malaria was rare. The conclusion was reached that *A. tarsimaculatus* was probably the most important vector of malaria. (EARLE subsequently arrived at a similar conclusion.)

N. W.

KIKER (Calvin C.), FAIRER (Charles D.) & FLANARY (Paul N.). **Further Observations on Airplane Dusting for *Anopheles* Larvae Control.**—*Southern Med. Jl.* 1938. July. Vol. 31. No. 7. pp. 808–813. With 4 figs. (1 map).

This is a description of the experience of the Tennessee Valley Authority with airplane dusting for Anopheles control during 1937,

on Lake Wheeler. The two airplanes used are described. A distribution of one pound of Paris green per acre, in a 20 per cent. by volume mixture, gave satisfactory results, except in areas of dense vegetation. The total cost per treated acre was 37 cents, as compared with 90 cents the estimated cost of boat and hand-dusting. *N. W.*

CLARK (H. C.) & KOMP (W. H. W.). **A Seventh Year's Observations on Malaria in Panama.**—*Amer. Jl. Trop. Med.* 1938. May. Vol. 18. No. 3. pp. 271–286. With 3 figs. on 2 plates.

These continued observations in an unsanitated area in the Panama Republic have as their object the determination of a method of malaria control suitable for commercial organizations in tropical lowlands where cost excludes anti-mosquito methods. The original plan was to direct special attention to young children and adolescents, the "seed-bed" of malaria infection. Quinine, atebrin and plasmoquine were used; the results were not promising. A certain number of carriers are missed at each survey and these are enough to keep up transmission and none of the drugs is sufficient to eradicate infection in large numbers of cases. Malaria exhibits cyclical variations in intensity in Panama and drugs cannot control such variations. A certain amount of natural immunity may be destroyed by treating all sub-clinical cases.

No new conclusions are drawn from the observations made in 1936–37 which are here reported. Three groups were under observation. Some 400 persons in villages on or near the Chagres River were surveyed every month. Those harbouring parasites were treated with atebrin, 0·1 gm. three times a day for five days, followed by plasmoquine, 0·01 gm. twice a day for five days. A similar number of people living in a village on the Gatuncillo, a tributary of the Chagres, were similarly examined once a month. Parasite carriers were treated with quinine sulphate, 15 grs. a day for five days, followed by five days treatment with plasmoquine as in the first group. The third group live in villages on the concrete highway between Madden Dam and Panama City. Here treatment was unsupervised; quinine sulphate in capsules, with a list of persons harbouring parasites, was left each month with a village officer. Those desiring treatment could get it and take it as they pleased. This was not a very good control group as there were many transients surveyed each month.

Taking all groups together the cumulative results of the year show that 29 per cent. of 841 adults and 41·4 per cent. of 1,057 children harboured parasites. It was a year of low malaria incidence. The parasite index of children from 0 to 5 years was 30·7, from 5 to 10 years 45·5, and from 10 to 20, 45·7. The parasite index of persons over 40 was high, 26·8. Considering only those persons, 83 in number, who were examined in all of the twelve monthly surveys, those found harbouring parasites more than once were 35·7 per cent. of the positive findings in the atebrin-plasmoquine group, and 61·5 per cent. in the quinine-plasmoquine group. Treatment of the former was better supervised.

In 682 positive examinations, *falciparum* was present in 73·2 per cent., *vivax* 13·9 per cent., *malariae* 1·5 per cent., *falciparum* and *vivax* 9·5 per cent., *falciparum* and *malariae* 0·6 per cent., *vivax* and *malariae* 0·6 per cent., *falciparum, vivax* and *malariae* 0·7 per cent. Crescent carriers were more numerous in the atebrin-plasmoquine treated group than in the unsupervised control group that received

only quinine. This may have been due to the greater frequence of heavy infections in the former. A heavy infection is one in which one or more parasites are found in each microscopic field of a thick film. Only eight of 59 infants below one year of age were found infected; seven of these were in the quinine plasmoquine group.

The mosquito infection rate of 355 *A. albimanus* dissected in a village of the atebrin plasmoquine group was 1·1 per cent.

The conclusion is reached that where the elimination of Anopheles is impossible the "immediate treatment of clinical cases is a most useful measure. Such treatment can be given most economically by non-medical personnel in the field. Such personnel should be supervised by a medical officer, who should make weekly inspection visits. By this method, low-grade infections will not be treated, and there will be little interference with the acquirement of natural immunity."

N. W.

ROZEBOOM (Lloyd E.). **The Rôle of Some Common Anopheline Mosquitoes of Panama in the Transmission of Malaria.**—*Amer. Jl. Trop. Med.* 1938. May. Vol. 18. No. 3. pp. 289–302. With 1 fig. [21 refs.]

When Darling showed from infection experiments that *A. albimanus* was the dangerous malaria vector in Panama eight species of Anopheles were known in Panama. Eleven species were listed, but *gorgasi*, *malefactor* and *franciscanus* have since then been shown to be synonymous with *tarsimaculatus*, *punctimacula* and *pseudopunctipennis*. Conditions in Panama have changed. The formation of Gatun Lake created new problems. Now 17 species of Anopheles are known to occur; most are rare and of no importance in malaria transmission. Recently discovered species that might be dangerous are *albitarsis*, *bachmanni*, *strodei* and *oswaldoi*. *A. oswaldoi* is abundant only in unpopulated districts and so is of no importance as a vector. *A. strodei* does not feed readily on man. This paper examines the possible rôle of *bachmanni* and *albitarsis* as vectors. *A. punctimacula* is also considered in view of Simmons's conclusion that this species is an important vector among military forces on the Atlantic side of the Canal Zone.

The author has previously shown that *A. bachmanni* can be infected with human malaria; *Pl. vivax* can develop in it to the sporozoite stage. It has, however, a marked preference for animal blood and is therefore relatively harmless.

An account is given of attempts to infect *A. albitarsis* with *Pl. falciparum*. One hundred were fed on seven gametocyte carriers. At the same time 113 *A. albimanus* were fed on the same carriers. Only four *albitarsis* became infected as compared with 37 *albimanus*.

The refractoriness of the Panama *albitarsis* to local *Pl. falciparum* strains is in marked contrast to the susceptibility of the Brazilian *albitarsis* to Brazilian strains of *falciparum*.

Observations on the habits of adult *A. albimanus*, *A. bachmanni* and *A. punctimacula* were made in the neighbourhood of two villages on the Chagres River. The identification of the two former species, based on adult characteristics, is uncertain. They can be distinguished, however, by examining the frill of the mature eggs in the ovaries. In *bachmanni* eggs the entire length of the frill lies on the dorsal surface of the egg; in *albimanus* eggs part of the frill dips down below the tips of the egg. Of 578 Anopheles captured in houses, 81·7 per cent.

were *albimanus*, 17·8 per cent. *punctimacula* and 0·5 per cent. *bachmanni*. Of 349 Anopheles caught in small pig pens near one of the villages 91·7 per cent. were *bachmanni*, 7·2 per cent. *punctimacula*, and only 1·1 per cent. *albimanus*. The village with the higher *bachmanni* density and lower *albimanus* density has persistently lower malaria infection rates than the other. *A. punctimacula* was too scarce to be of importance in malaria transmission in the Chagres River villages.

The author concludes that malaria control in Panama is still dependent upon the control of the only really dangerous anopheline present, *A. albimanus*. *N. W.*

FARINAUD (E.). Données récentes sur la transmission du paludisme dans les régions maritimes d'Indochine méridionale. [**Recent Data on the Transmission of Malaria in Maritime Districts of Southern Indo-China.**]—*Bull. Soc. Path. Exot.* 1938. May 11. Vol. 31. No. 5. pp. 397–401.

Malaria in the deltas and on the southern coast of Indo-China is incomparably less severe than in the hyperendemic hilly interior, but severe outbreaks may occur. Severe forms of the disease are, however, rare and the mortality is low. Malaria on the coast is not endemic. Recent observations in three coastal places, Poulo-Condore, Gocong and Cap Saint-Jaques, have shown that a sudden increase in malaria morbidity has been accompanied by an equally sudden increased prevalence of salt-water breeding anophelines, of which the most important is *A. sundaicus*. *A. subpictus* and *A. sinensis* may play rôles of secondary importance. This increased prevalence of salt-water breeding anophelines is transient. In Gocong 125 *ludlowi* were caught in November, 10 in December and only 2 were found in February. Similar observations were made in Cap Saint-Jaques. In natural conditions *ludlowi* appears to be short-lived. *N. W.*

GENEVRAY (J.), TOUMANOFF (C.) & HOANG-TICH-TRY. Etude préliminaire d'un foyer de paludisme épidémique dans une localité du delta tonkinois. [**Preliminary Study of a Centre of Epidemic Malaria in the Tonking Delta.**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1937. Dec. Vol. 15. No. 10. pp. 1138–1157. With 4 figs. & 1 folding map. [10 refs.]

This is an interesting account of a severe epidemic of malaria in the village of Ha-tri in the autumn of 1937. Ha-tri is in the Tonking Delta, on the bank of the Red River, far from the sea and only nine miles from Hanoi. The village has a population of 5,900 and consists of four adjacent hamlets ; in the worst affected of the four the highest spleen index observed was only 24 per cent., whereas the parasite index was 90 per cent. and the gamete index exceeded 80 per cent. *Pl. falciparum* was most in evidence. Of 320 larvae examined in October and November 73 per cent. were *hyrcanus* var. *sinensis* and 16 per cent. *aconitus*, the remainder being *vagus*. Of the 921 adults caught 217 were *aconitus*, 448 *hyrcanus* var. *sinensis*, 247 *vagus*, 8 *tesselatus* and a solitary *jeyporiensis*. This is the first occasion on which *jeyporiensis* has been found at sea-level in Indo-China where the species was considered to be confined to high altitudes. The relatively high frequence of *aconitus* is exceptional in the Tonking Delta.

Old borrow pits made during the construction of a bund were the most important breeding places of anophelines. These were most numerous near the worst infected hamlet. Some fifty precipitin reactions were carried out on engorged mosquitoes; 41 per cent. of *aconitus* and 33 per cent. of *hyrcanus*, captured in human habitations were gorged with human blood. The small number of cattle in the village and intense anopheline breeding contributed to the high degree of anthropophilism of the mosquitoes caught in the worst infected hamlet. Two of 67 *A. aconitus* dissected harboured sporozoites; none of 189 *hyrcanus* dissected was found infected. *N. W.*

LEFEBVRE (M.). Notes sur l'épidémiologie du paludisme au Laos. [**The Epidemiology of Malaria in Laos.**]—*Bull. Soc. Path. Exot.* 1938. Apr. 6. Vol. 31. No. 4. pp. 281–285.

These notes from the laboratory at Vientiane are in two parts; the first recounts the results of blood examinations, the second spleen examinations. With the exception of a few towns on the banks of the Mekong, malaria exists throughout Laos in a hyperendemic form, with somewhat less intensity, however, in the plains which border the river. It is by far the most important cause of morbidity and mortality and is a serious obstacle to the development of the country. The mean parasite index of the country is about 43 per cent. *Pl. falciparum* infections are most frequent, 72·4 per cent. of clinical cases and 63·9 per cent. of chronic cases: *Pl. vivax* comes next, 18·6 per cent. of clinical cases and 20·4 per cent. of chronic cases. The remainder are quartan infections. Quartan malaria is most prevalent in the two northern provinces which border Burma, 24 to 26 per cent. There are two annual exacerbations of the disease, the first in May and June at the beginning of the rains, the second in October, at the beginning of the cold season. The mean splenic index of the country is 59 per cent. The vast majority of the population is infected early in life. Repeated infection, occasioned by an abundance of anopheline vectors, determines a state of premunition. Clinical manifestations of the disease are therefore relatively uncommon and not severe. The abundance everywhere of apparently healthy looking parasite carriers implies great dangers for all non-immune immigrants. *N. W.*

CORRADETTI (Augusto). Ricerche epidemiologiche sulla malaria nella regione Uollo-Jeggiu durante la stagione delle piogge. [**Epidemiological Observations on Malaria in the Uollo-Jeggiu District during the Rainy Season.**]—*Riv. di Malariologia.* Sez. I. 1938. Vol. 17. No. 2. pp. 101–110. With 1 fig. English summary.

The observations recorded relate to a labour force engaged on road construction work on the Asmara-Addis Ababa road as it traverses the Uollo Jeggiu region. From July to October, every ten to fifteen days, the blood was examined of every worker who had suffered from any febrile disorder since the previous examination. The majority of the men employed had never previously suffered from malaria. Malaria is widespread at altitudes below 5,400 feet. No mention is made of the number of men employed. In all 1,431 blood examinations, thick drop, were made. Parasites were found in 448: *falciparum* in 284, *vivax* in 151, both in 13. *Pl. malariae* was not seen. The anophelines identified were *gambiae*, *mauritianus*, *christyi*, *pretoriensis* and *garnhami*. *A. gambiae* is the chief vector. The precipitin test on 214

gambiae captured in barracks showed 57·4 per cent. positive for human blood. Eight specimens of *A. mauritianus* var. *paludis* were also examined; they all contained human blood. This species may be of importance in malaria transmission. The other species found do not appear to be of malarial importance. *N. W.*

MIRA (Mario Giaquinto). Accertamenti sullo stato endemico della malaria nelle zone di Moggio—regione del Lago Zuai—Dessiè—regione del Lago Haik—Ambò. [**Endemicity of Malaria in the Moggio Area, the Region of Lake Zuai, Dessie, the Lake Haik Region, and Ambò.**]—*Rass. Sanitaria d. Impero.* Addis Ababa. 1938. Jan.–Feb. Vol. 1. No. 4–5. pp. 9–30. With 11 figs. on 4 plates. [25 refs.]

This is an account of an inspection made of parts of Abyssinia to determine the malaria conditions prevailing therein. It is illustrated by photographs depicting the nature of the country and the types of some of the inhabitants. In Moggio and Lake Zuai districts the spleen index varied from 4 in Adami Tullo to 33·3 in Moggio. In most parts the parasite index was between 10 and 12. *Pl. vivax* was more in evidence than *Pl. falciparum.* The species of anophelines identified were *coustani, pharoensis, cinereus* and *de meilloni.*

In Dessie the spleen index was 10·3, parasite index 2·5, all *vivax* infections. *A. cinereus* and *A. de meilloni* were found. No anophelines were found along the shore of Lake Haik and no parasite carrier. In Borchenna at 1,600 metres there was a spleen index of 24 and a parasite index of 8; *vivax* and *falciparum* were equally prevalent. The anophelines found were *de meilloni, cinereus, pretoriensis* and *gambiae.* In Ambò the spleen and parasite indices were both zero; *A. de meilloni* was present. *N. W.*

PARROT (L.) & CATANEI (A.). Sur la fréquence et les modalités des infections paludéennes mixtes en Algérie. [**Frequency of Mixed Malarial Infections in Algeria.**]—*Arch. Inst. Pasteur d'Algérie.* 1938. Mar. Vol. 16. No. 1. pp. 10–13.

A population of a highly malarious part of Algeria was recently kept under observation for 17 months during which time very abnormal meteorological conditions caused a cessation of anopheline breeding so that fresh infections ceased altogether. The blood of 1,878 persons was examined on 23 occasions: of these persons, 311 harboured parasites at one time or another. Two hundred and seventy-four, 88·1 per cent., of these were single infections, *falciparum* 165, *vivax* 68 and *malariae* 41. Thirty-seven, 11·8 per cent., had mixed infections. The association of parasites in these mixed infections was *falciparum* and *vivax* 25, *falciparum* and *malariae* 6, and *vivax* and *malariae* 5. All three species were associated in one case. *N. W.*

BUONOMINI (Giulio). Malaria e lotta antimalarica a Castelvolturno (Napoli) nel 1937. Nota. [**Anti-Malaria Measures at Castelvolturno (Naples).**]—Reprinted from *Rendiconti d. R. Accad. Sci. Med. e Chirurg. d. Soc. Reale di Napoli.* 1938. Vol. 92. 15 pp.

Castelvolturno is a little township of 1,389 inhabitants on the left bank of the Volturno and lies to the north-west of Naples. The standard of living is low: sanitation is non-existent. The houses are

of the poorest. The population are for the most part agricultural labourers and buffalo-herds. Malaria is very prevalent as is helminthiasis (ascaris and trichuris).

During 1936 and the first five months of 1937 the number of primary cases of malaria recorded was 36, and of relapses 735. A house-to-house census was made. In all 366 persons, who had recently suffered from malaria, underwent curative treatment, consisting of atebrin (0·3 gm. a day) for five days, and after 5 days' interval, a three-days' course of plasmoquine, 0·03 gm. a day. Proportionally smaller doses were given to children below the age of 15. The drugs were given in the patients' homes after the evening meal. In two cases of the 366 the administration of plasmoquine was followed by severe symptoms, intense vomiting and methaemoglobinuria.

Of the 366 persons who had undergone this treatment at the beginning of June 291 received the drugs prophylactically each week till the 30th October. Adults received 0·2 gm. atebrin and 0·01 gm. plasmoquine each Saturday and Sunday. A further 23 persons who had not undergone curative treatment received this prophylactic treatment.

The results were encouraging. The persons who underwent treatment were among the poorest and more exposed to infection than the remainder of the population: there were many cases of chronic malaria among them. In spite of this, and a high prevalence of anophelines, clinical attacks of malaria were less frequent among them than among the rest of the population. *N. W.*

FAUST (Ernest Carroll). **Malaria Mortality in the Southern United States for the Year 1936.**—*Southern Med. Jl.* 1938. July. Vol. 31. No. 7. pp. 816–818. With 1 fig. (map).

Mortality data are the only reliable malaria records in the fourteen States here considered. The malaria death rate for these States combined was 10·2 per 100,000 in 1936 as compared with 11·0 in 1935. The population of these States approximates 35 million. In three States, Georgia, North Carolina and Oklahoma, there was an increased prevalence in 1936. The disease appears to be more prevalent in the coastal portions of Georgia, South Carolina, North Carolina and Virginia, in the southern half of Alabama and the north-central part of Florida and is extending into the highlands of the Carolinas and into the northern part of Alabama. On the other hand the Mississippi delta reported considerably fewer malaria deaths.

There is a higher average malaria mortality in the southern United States than there was ten years ago. Malaria is extending into areas in which malaria was then of little importance. The factors influencing the spread of the disease and the cyclic fluctuations of malaria mortality are unknown. Malaria is becoming an increasing menace to life and to economic development in the Southern States in spite of increased efforts to control the disease. *N. W.*

MANSON (D.). **A Method of Anti-Larval Oiling for Rivers.**—*Indian Med. Gaz.* 1938. May. Vol. 73. No. 5. pp. 284–285. With 2 figs.

In the rivers and streams of Assam in the intervals between heavy rainfalls, when the velocity of flow falls below two miles an hour, larvae of *A. minimus*, the most important local vector, are found in

abundance along the banks. This necessitates the use of a larvicide during the monsoon months, in conditions which render the application of oil by usual methods difficult and costly. A method which has given good results is described. A strip of coarse gunny about 15 feet long and 3 feet wide is selected: the mesh should be as wide as possible. To one side of this strip transverse strips of wood or bamboo are tied at intervals of 2 to 3 inches. The object of these strips of wood is to support the gunny on the water: the lighter they are the better. They are on the upper side of the gunny when in use. The gunny mat is well oiled with Malariol, rolled up and carried to the river bank. It is unrolled quickly over the area to be treated, one edge resting on the bank. After 15 to 20 minutes the mat is rolled up and used again. One oiling is sufficient for three or four areas the oil being conserved in the meshes of the gunny. This method of oiling is very cheap and has been successful where other methods have proved wasteful and only partially effective. *N. W.*

RECTOR (Nelson H.). **Different Phases of Permanent Drainage for Malaria Control in Mississippi.**—*Southern Med. Jl.* 1938. July. Vol. 31. No. 7. pp. 813–815. With 3 figs.

Malaria is an important cause of sickness in Mississippi but it is only very recently that any attempts have been made to control mosquito breeding by permanent measures. This paper describes the progress that has been made. Filling of ponds, concrete lining of ditches and the drainage of marshy areas by underground tile drains have been used. Ditch lining receives most attention. A round bottom invert with the banks of the ditch covered with Bermuda sod gives the best results in local conditions. Wood ash is a satisfactory fertilizer for the sod and enables it to remain green all the winter. *N. W.*

THOMAS (J. W.) & SYDENSTRICKER (V. P.). **Further Notes on Pernicious Malaria.**—*Southern Med. Jl.* 1938. Mar. Vol. 31. No. 3. pp. 300–302. With 1 fig.

Two hundred and forty-four cases of malaria were hospitalized on account of the severity of symptoms during a three-year period. The mortality rate was 4·09 per cent. All deaths were cases of *falciparum* infection with pernicious symptoms. There were 76 cases of pernicious cerebral malaria, of which the mortality rate was 11·86 per cent. In the treatment of these cases Ringer's solution is given subcutaneously, 2 to 4 litres during the first 24 hours, to combat dehydration. Dextrose solution, 10 per cent., is given intravenously, 500 cc. every 4 to 6 hours. Quinine dihydrochloride, 0·5 gm., is added to the first dextrose injection. This dose is repeated every six hours until the acute cerebral symptoms have disappeared, or until the patient is able to take drugs by mouth. When vomiting stops the drug is given by a duodenal tube in preference to continued intravenous medication. In most cases only one intravenous injection of quinine was required. *N. W.*

CANOVA (F.). Sindromi appendicolari malariche. [**Malaria simulating Appendicitis.**]—*Riv. di Malariologia.* Sez. I. 1938. Vol. 17. No. 2. pp. 137–142. [13 refs.] English summary (10 lines).

The author describes three cases which were admitted to hospital with symptoms characteristic of appendicitis. In all three infection

with *Pl. falciparum* was responsible for the condition which cleared up rapidly with appropriate malaria therapy. The symptoms appear to be due to abnormal stimulation of the sympathetic nervous system. The condition is rare ; these cases were the only three observed among some 8,000 cases of malaria treated. *N. W.*

VAUTHEY (Paul) & VAUTHEY (Max). Paludisme et lithiase biliaire. (Etude clinique et statistique sur 100 cas observés à Vichy). [**Malaria and Biliary Calculi : Clinical and Statistical Study of 100 Cases observed at Vichy.**]—*Arch. Méd. Gén. et Colon.* 1938. Vol. 7. No. 2. pp. 50–61.

Vichy is a spa that has special attractions for those who have suffered from malaria as well as those suffering from cholelithiasis. It is not surprising therefore to find that a considerable number of persons suffering from the latter complaint give a history of antecedent malaria. With the object of trying to determine what part, if any, malaria plays in the causation of cholelithiasis the authors have brought together notes of the last hundred cases of this kind that have come under their observation. In 23 of these cases biliary colic first made its appearance during an attack of malaria ; in 71 cases biliary colic appeared after the extinction of all clinical signs of malaria ; in the remaining six cases information was incomplete. In 15 cases there appeared to be no doubt that malaria was the cause of the lithiasis ; in 16 other cases in which lithiasis appeared after cessation of clinical signs of malaria, malaria may have been an aetiological factor. In some of these there was no other ascertainable cause of the lithiasis ; in others malaria may have contributed by damage done to the liver tissue. *N. W.*

FISCHER (O.). Ueber einen Fall von Malariaexanthem. [**Case of Malarial Skin Lesion.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1938. Aug. Vol. 42. No. 8. pp. 372–375. With 1 fig.

The author describes a case of benign tertian malaria during the course of which a crop of petechiae, each about the size of a pinhead, appeared in the skin of both legs, also a larger extravasation occurred on the left hand after accidentally striking it against the side of the bed. A biopsy of one of the petechiae was made and showed that there was a collection of cells round the vessels near the extravasation in the skin ; malaria parasites could not be determined with certainty ; pigment, not malarial pigment, was present in the collection of cells, probably it was natural skin pigment. He discusses the question of the subcutaneous haemorrhages being due to quinine and refers to the paper of MÜHLENS (see this *Bulletin*, 1938, Vol. 35, p. 103) on this subject, but rules out quinine as a cause in his case. The lesions disappeared along with the fever after quinine treatment. [The reviewer saw recently in a case of malaria therapy for G.P.I. a similar lesion. Crops of petechiae appeared in the skin on various parts of the body, and one large extravasation occurred over the buttocks. Quinine had not been given before the cutaneous haemorrhages appeared. *Plasmodium vivax* was used in the case.] *E. D. W. Greig.*

ESKIN (V. A.). [**A Case of Natural Infection with** *Plasmodium ovale* **in Man from U.S.S.R.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1938. Vol. 7. No. 1. [In Russian pp. 40–43. With 9 figs. on 2 plates.]

The author describes a case of infection with *Plasmodium ovale* contracted by a patient near Ufa (eastern Russia), which is the first record of this species from Europe. Though *P. ovale* was present in the blood together with *P. vivax*, the two parasites could easily be distinguished morphologically in those stages which differentiate them, while the changes in the erythrocytes were also typical. In anophelines infected from this case oöcysts and sporozoites were found to develop at a different rate. Blood from this case was used in five successive passages through G.P.I. patients, in the blood of which *P. ovale* likewise made its appearance. The attacks of fever were easily controlled by a single course of atebrin treatment. *P. ovale*, as observed in this case, is described in detail, with good figures illustrating all stages of development of this parasite. The author points out that he submitted blood films from this case to Dr. WENYON and the reviewer, who were able to confirm his diagnosis. *C. A. Hoare.*

SIMONS (H.). Nouvelle méthode de coloration et de diagnostic des protozoaires sanguicoles dans les gouttes épaisses (saponine-bleu de méthylène). [**New Method of staining Thick Films.**]—*Bull. Soc. Path. Exot.* 1938. Feb. 9. Vol. 31. No. 2. pp. 100–106. [16 refs.]

For the purpose of rapid diagnosis of blood parasites the author advocates the use of the following mixture, which dehaemoglobinizes the red cells by virtue of the saponin and stains the parasites and leucocytes by virtue of the methylene blue.

Distilled water	300 cc.
Methylene blue	0·6 gm.
Sodium chloride	1·8 gm.
Sodium citrate	3·0 gm.
Saponin	2·0 gm.
Formol (15 per cent.)	12 cc.

The mixture is poured over a thin or thick film and allowed to act for one or two minutes. In the case of thick films the stain is poured off and fresh stain applied. According to the thickness of the film this is repeated three to five times. When staining is complete the stain is poured off and a cover glass applied, examination of the film being made in the small quantity of stain remaining under the cover glass. There being little danger of the thick film floating off the slide, drying in the first place may be conducted rapidly by repeated gentle warming in a flame and blowing. The whole process of preparation and staining of a thick film does not occupy more than three or four minutes—a considerable saving of time when rapid diagnosis is necessary.

C. M. Wenyon.

Fig. 1. Slides fastened between the spirals of springs.

Fig. 2. Blocks of slides in staining dish.
[Reproduced from the *Taiwan Igakkai Zasshi.*]

MATUMOTO (Tomekiti) & HIRASIKI (Yasuo). **A New Simple Method of staining the Films for the Mass Diagnosis of Malaria.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1938. Apr. Vol. 37. No. 4 (397). [In Japanese pp. 772–774. With 4 figs. on 1 plate. English summary p. 774.]

For the rapid staining of large numbers of blood films the authors devised a method for which the apparatus is :—

1. A spiral steel spring 16·5 cm. long, 0·15 cm. diameter, the distance between spirals being about 0·075 cm.

2. A wooden plank in which two nails are driven, to fix the spring while the slides are being inserted, at a distance of about 24·5 cm.
3. A staining dish.

Method : Fix the spring between the nails, insert the slides between the spirals, remove the spring from the nails, immerse the films in Giemsa's stain for the usual length of time, wash and dry. After drying, extend the spring, thus releasing the slides. In the illustration only the ends of the slides are immersed, presumably the blood is placed there to save stain.

C. W.

GARCIA (Eusebio Y.). **To demonstrate Free Malarial Parasites in Vitro.**—*Jl. Philippine Islands Med. Assoc.* 1937. June. Vol. 17. No. 6. pp. 347–348. With 2 figs. on 1 plate.

For the study of malarial parasites the author has obtained good results by putting up malaria infected blood as for culture of the parasites and keeping the culture tubes at 10°C. instead of at 37°C. Control tubes can be kept at the higher temperature. Samples can be withdrawn and studied by the usual methods. *C. M. W.*

RODHAIN (J.) & MUYLLE (G.). Sur la spécificité des plasmodium des anthropoides de l'Afrique Centrale. [**Specificity of Plasmodia of Central African Apes.**]—*C. R. Soc. Biol.* 1938. Vol. 127. No. 14. pp. 1467–1468.

REICHENOW the discoverer of the three species of Plasmodium of chimpanzees in the Cameroons, considered them to be identical with *vivax*, *falciparum* and *malariae*, a view which has not been generally adopted by later observers. The authors of this paper have had no difficulty in transmitting these parasites from chimpanzee to chimpanzee. They have had an opportunity of trying to infect three patients requiring malaria therapy with the *vivax* and *falciparum* types of these parasites, but without success. The first had an intramuscular injection of 5 cc. of chimpanzee blood containing numerous schizonts and gametes of the *vivax* type ; the second had an intravenous injection of 2·5 cc. of chimpanzee blood containing scanty small rings of the *falciparum* type as well as a few schizonts of the *vivax* type ; the third had an intravenous injection of 5 cc. of chimpanzee blood containing fairly numerous small rings of the *falciparum* type. None of the three patients contracted infection. *N. W.*

SANDICCHI (Giovanni). Sul potere infettante degli sporozoiti immaturi. [**Infectivity of Immature Sporozoites.**]—*Riv. di Malariologia.* Sez. I. 1938. Vol. 17. No. 1. pp. 78–82. English summary.

The author of the present note and JERACE have previously described experiments which in their opinion proved that malarial sporozoites (*P. praecox*) before they reach the salivary glands, or even shortly after they have entered them, are immature and incapable of producing infection when injected into the vertebrate. MISSIROLI and NERI subsequently contested this conclusion and maintained that sporozoites from the body cavity of mosquitoes were infective. The author now argues that there is a possibility that in dissection of mosquitoes heavily infected salivary glands may rupture and liberate mature sporozoites into the body cavity. *C. M. W.*

CORRADETTI (Augusto). Osservazioni sul ciclo schizogonico dei plasmodi nelle cellule dei tessuti e proposta di una nuova classificazione degli *Haemosporidiidea*. [**Schizogony Cycle of Plasmodia in Tissue Cells. Proposed New Classification of the Haemosporidiidea.**] —*Riv. di Parassit.* Rome. 1938. Jan. Vol. 2. No. 1. pp. 23–37. [16 refs.] English summary.

The author points out that the view that there must exist stages of development of malarial parasites other than those which occur in the red blood corpuscles, in order to account for the behaviour of parasites directly after the injection of sporozoites and the resistance of certain infections to treatment, ought to be attributed to GRASSI and GOLGI, who were the first to suggest that such undiscovered stages exist. The recently discovered stages of development in endothelial and other cells in various bird malarial infections are not the forms into which sporozoites directly develop before invasion of the red cells occurs, for they are found after injection of sporozoites as well as after injection of the red blood cell forms. This discovery suggests that the plasmodia and halteridia are not sharply separated from one another and that it would be more rational to group the two types of parasite in one family, the Plasmodiidae. *C. M. W.*

MISCELLANEOUS.

CHOPRA (R. N.). **The Physiology of the Individual in the Tropics. Parts I & II.**—*Indian Med. Gaz.* 1938. Jan. & Feb. Vol. 73. Nos. 1 & 2. pp. 40–45; 102–109.

——. **The Physiology of the Individual in the Tropics.**—*Jl. Trop. Med. & Hyg.* 1938. Mar. 15. Vol. 41. No. 6. pp. 89–97. [13 refs.] [Summary appears also in *Bulletin of Hygiene.*]

This abridged account of the Presidential Address given to the Section of Physiology at the last Indian Scientific Congress (1938) is a considered review of the state of knowledge in an important but rather neglected subject. The address is worthy of close attention not only for the array of facts and theories condensed from a wide reading of the literature and illuminated by a thorough understanding of the complexities, but also for the formulation of a number of principles which help to co-ordinate and explain many of the phenomena so far reported.

In the more detailed discussion of changes and responses on the part of the body to habitation of the tropics Professor Chopra maintains a justifiably critical viewpoint in evaluating findings and ideas advanced in the literature. At the same time he puts forward a number of stimulating suggestions for enquiries into various questions. His concluding remarks embody a plea for more and more careful research in this complex field in which the material is so abundant and so promising of valuable discoveries. *J. S. Weiner.*

PRIDIE (E. D.). **The Hospital Administration of the Sudan Medical Service.**—*Nosokomeion.* 1938. Apr. Vol. 9. No. 2. pp. 97–103. With 1 map.

The staff at headquarters consists of a Director and three Assistant Directors (of public health, hospitals, and laboratories and research) and there are four specialists (in medicine, surgery, obstetrics and ophthalmology). The teaching of subordinate Sudanese staff is under the control of the Assistant Director (hospitals) but the Kitchener School of Medicine is a non-Government organization controlled, as regards its academic work, by a school council of which the Director of the Medical Service is *ex officio* chairman.

Each province has a parent hospital, a number of smaller hospitals, and a number of dispensaries. Thus there are 38 hospitals and 337 dispensaries administered by the Service. In addition a hospital ship, with accommodation for about 40 in-patients, and a motor launch are used on the Nile.

Distances are so great and transport so difficult in some places that the cost of drugs is enormously increased. For the same reason small Native villages called rustic hospitals are built near hospitals or dispensaries to accommodate patients who require constant but not in-patient treatment, for example cases of syphilis and chronic ulcer.

In Khartoum a central block of administrative, hospital and laboratory buildings will be completed in a few years.

Of the 43 British doctors in the Service, 32 are available for routine duties and are termed Medical Inspectors. They are not as a rule attached to any hospital (except to a few of the larger ones) but exercise a general supervision over the hospitals and dispensaries of a

province or large district, acting as consultants. The senior medical officers of provinces are responsible for both hospital and public health work.

"Curative medicine must be the first approach to the medical administration of a primitive country in order to create confidence in the medical service, and sweeten the pill of preventive medicine which should follow it. Preventive medicine should then become the principal aim of a service so that at a later stage of development, crowded hospitals and dispensaries become a cause for misgiving instead of satisfaction."

The medical officers who are in charge of hospitals are Sudanese doctors who have qualified at the Kitchener School of Medicine. "In the Sudan Medical Service where the proportion of local staff has been steadily increasing for many years about 90 per cent. of the officials are Sudanese."

Nursing is carried out by locally trained male and female nurses and midwives. British Sisters travel by air in emergencies. Sudanese trained by the British X-ray technician are in charge of X-ray sets in various places. Sudanese laboratory assistants are trained in Khartoum and distributed to the provinces.

In an area of 969,600 square miles, 5,542 beds and 107 qualified doctors are available for the 5,944,477 inhabitants, and in 1936, 96,081 in-patients were admitted and 11,229 operations performed.

[It would be interesting, in view of the importance of the subject of the training of African Natives in modern medicine, if the author, who is Director of the Sudan Medical Service, could follow this up with an account illustrating the efficiency of the Sudanese members of the medical staff. Such a report might stimulate the increase of similar training in other parts of Africa.] *C. W.*

CASTELLANI (Aldo). **Hygienic Measures and Hospital Organisation of the Italian Expeditionary Forces during the Ethiopian War, 1935–36.**—*Jl. Roy. Soc. of Arts.* 1938. May 27. Vol. 86. No. 4462. pp. 675–689. [Summary appears also in *Bulletin of Hygiene.*]

The war officially extended from 3rd October, 1935, to 9th May, 1936, a period of seven months (219 days) covering the healthy period of the years and avoiding the dysentery, malarial and sandfly seasons. The total European forces, including police, naval ratings and irregulars, numbered 500,000 men [but the average daily strengths are not stated].

Prophecies of heavy disease incidence are mentioned. A series of well-known stock examples of previous campaigns of 30–40 years ago with very high morbidity are quoted for comparison, but no comparisons with modern campaigns of similar type are mentioned.

It was fortunate that the head of the Italian Government realized the enormous importance of medical arrangements and demands in a tropical country. These were all placed under one control, were complied with in full and were at times even given priority over munitions.

The medical organization, given in detail, included 135 base and field hospitals; 139 water sterilizers, Potabilizzatori; and 18 cleansing sections and stations. The total of medical officers is given as 2,484 [approximately 5 per 1,000 of strength] and subsidiary services such

as chemists, pharmacists and army chaplains 456. Red Cross nurses numbered 384, and nuns and missionaries 200. Of rank and file there were in all 15,500 on land and 639 on ships. The former appear to have been used extensively for roadmaking.

A series of slides was shown to demonstrate the results of this health organization.

Malaria.—Comparative figures from Macedonia and the Struma Valley are stressed and the statement made that in the tropics the malarial season may be said to extend through the whole year and that this applied to parts of Ethiopia. Malarial admissions were 2,334, 1,241 fresh and 1,093 relapse cases [approximately 8 per 1,000 per annum] and deaths 23. These results are attributed to prophylactic quinine, sulphate or bihydrochloride, 9 grains daily, checked by Tanret examinations of urine.

Dysentery was rampant in the Crusades and in the Middle Ages and in such recent campaigns as Madagascar and Gallipoli. The Italian cases in this war are given as 453 with no deaths and the great majority are said to be *amoebic* dysentery. This is attributed to the prophylactic measures taken, *viz.* :—

(*a*) Water supplies ; imported naturally pure or purified by boiling [no mention is made of the time or fuel required for this herculean task] or by chlorination, a fairly stable chlorine-containing tablet being used.

(*b*) Washing of hands after visiting the latrine with 4 or 5 drops of 2 per cent. lysol.

(*c*) The use of a flannel abdominal belt.

Typhoid and paratyphoid.—Figures are quoted from French, British and American campaigns of the last century, showing the heavy incidence of these diseases. In this campaign there were 458 cases with 161 deaths [35 per cent. of case mortality]. Among the precautions taken a Tetra vaccine (Typhoid+para, A and B+cholera) was used.

Relapsing fever, 17 cases ; of other diseases such as typhus, beriberi, pellagra, scurvy, ankylostomiasis, filariasis, leprosy, gas gangrene, cerebrospinal fever, plague and cholera there were no cases. Of the intestinal worm infections it is stated that there were only two cases.

For avitaminosis the principal prophylactic measure consisted of a balanced ration similar to the soldiers' ration in Italy with the addition of a lemon a day.

Minor diseases received much attention and descriptions are given of scorpion bites, prickly heat, jiggers and dhobie itch.

In summing up the author states that morbidity and mortality was less in the war zone than in similar numbers of troops in Italy. [No figures for sick or death rates among the latter are given.] The total number of deaths were 1,099 from battle casualties and 599 from disease. [This gives a death rate from disease of 2·05 per 1,000 per annum, a truly remarkable figure.] *T. O. Thompson.*

STEVENS (H. Lockwood). **Tropical Diseases. Their Cost to Plantation Industries.**—Reprinted from *Empire Producer*. 1938. Feb. 2 pp.

The author gives a brief account of the inception of the Ross Institute of Tropical Hygiene, now amalgamated with the London School of Hygiene and Tropical Medicine. Emphasis is laid on the economic aspect of malaria, and the author points out that the Ross Institute owes its origin not only to Sir Malcolm WATSON and his

co-workers, but also to those business men who realized that malaria in plantation labourers costs more than scientifically regulated control, and that the improvement in the general health of labourers and their families which follows such control, is, on both economic and humanitarian grounds, strongly to be desired. Healthy plantations attract labour and offer inducements for the permanent settling of families. Unhealthy plantations often experience difficulty in maintaining an adequate labour force.

Figures are given. In large estates in Malaya it was found on careful analysis that " the cost of production on estates where malaria was not controlled was 25 per cent. higher than on estates where anti-malaria measures were in force." On certain estates in India, sick days in 1927 totalled 249,306. In 1933, by which time anti-malaria measures had been instituted, the sick days totalled 141,687, and £6,000 per annum was being saved in the cost of the maintenance of sanitation and general health. On other Indian estates, the annual admissions to hospital of cases of malaria fell from 10,378 in 1929 to 848 in 1935, a reduction of 92 per cent., and the admissions from causes other than malaria fell from 28,659 to 16,143 in the same period. " The medical officer of the group (of estates) estimated that the annual saving due to anti-malaria measures, taking into account the cost of these measures, was £4,500."

Six hundred laymen have now attended the free course on malaria control (lasting one week) which has been organized by the Institute.

C. W.

VICKERS (W. J.) & STRAHAN (J. H.). **A Health Survey of the State of Kedah with Special Reference to Rice Field Malaria, Nutrition and Water Supply. 1935–1936.**—pp. v + 96. With 4 maps, 36 figs. on 16 plates & 12 charts. [$1·50.]

[The sections of this report dealing with malaria and nutrition are abstracted elsewhere, see this *Bulletin*, 1938, Vol. 35, p. 416 and *Bull. of Hyg.*, 1938, Vol. 13, p. 559.]

In the introduction to this report the special methods of investigation adopted are described, particularly the method of approaching the rural population and of securing the voluntary co-operation of the headmen. Headmen were informed by Government that the survey was to be made, and were interviewed by the Health Officer. Lists of inhabitants were obtained, examination centres arranged, and leading residents interviewed, by the senior inspector, who made notes on health conditions and previous epidemiological findings. After this preparation, the survey staff arrived on a pre-arranged date and combined their epidemiological work with treatment of disease. That the population in most districts readily responded to the advances made must largely have been due to the thoroughness with which the ground was prepared and the tact with which the religious and civil headmen were treated. This account of preliminary education and persuasion may serve as a model for such undertakings.

The widespread and severe anaemia encountered among this rural population is mainly due to the three conditions of malaria, helminthic infestation and bowel disease and dietary defects, and the authors believe that malaria may not be so important in this respect as the other conditions, though it is undoubtedly a factor. Examination of

faeces was impracticable, but helminthic infestation is almost universal, and the presence of nutritional anaemia is proved.

The intestinal conditions are bound up with the state of the water supply which, in 75 per cent. of the population, is uncontrolled. Streams are used both as latrines and sources of domestic water supply. and the other sources are usually open to contamination. The authors make recommendations on this difficult subject and record their opinion that " a wholesome water supply and education in the wearing of shoes might prove the most practicable solutions " of the intestinal problem.

With regard to other diseases, the authors think that many mild cases of enteric occur but are not reported, that pneumonia is commoner than reports indicate, that there have been mild epidemics of influenza and measles, but that tuberculosis, venereal disease, diphtheria and cancer are relatively unimportant. Yaws and leprosy are constantly present, and a quarter of the population suffer from skin disease, of which " a large proportion may be classed as ' dirt ' disease." Minor degrees of avitaminosis were seen in 222 instances in 10,000 people examined, and major forms in a small number, and goitre (due to iodine deficiency) and cretinism are relatively common. Deaths from pregnancy and childbirth are high. The authors are uneasy over the finding that 15 per cent. of the population are unvaccinated.

The figures and photographs with which the report is illustrated are clear and well chosen, and the whole publication is an example of how the difficulties inherent in such a survey have been overcome, and of how valuable information as to the state of health of a backward community may be obtained by enthusiasm combined with careful preparation. It would be interesting to read in due course a companion volume of the results obtained by putting into effect the suggestions made by the authors. *C. W.*

BLACK (E. Couper) & CLELAND (J. Burton). **Pathological Lesions in Australian Aborigines, Central Australia (Granites), and Flinders Range.**—*Jl. Trop. Med. & Hyg.* 1938. Mar. 1. Vol. 41. No. 5. pp. 69–83. With 12 figs. & 1 map. [16 refs.]

These notes were made during two anthropological expeditions, the first to the Granites in the Northern Territory, 380 miles N.W. of Alice Springs, lat. 21°S., the second to Nepabunna Mission Station in the Flinders Range, 375 miles N. of Adelaide at 30°S.

At the Granites, where rainfall is about 10 inches, 50 natives were collected, nearly all nude and living their natural nomadic life. An account is given of the neoplasms and cysts seen, diseases of the alimentary tract and male generative organs, of muscles, bones, and joints, of skin and subjacent tissues including scars and keloids, of eye and teeth lesions.

The chief interest for readers of this *Bulletin* lies in the Treponema infections; special reference is made to HACKETT's account of boomerang leg [see this *Bulletin*, 1936, Vol. 33, p. 962] and HUDSON's work on Bejel on the Euphrates [*loc. cit.* p. 966]. Of 17 natives who were closely studied some degree of boomerang leg was noted in seven, four of which occurred among six children. The condition was most marked in children aged 8–12 years and the authors suggest a nutritional defect, possibly a result of drought. Of the three adults two had

gangosa and no other cases were seen. Three of the children whose blood was examined had a positive Wassermann.

A table shows the Wassermann serum reactions grouped by age and sex. In 39 natives of all ages the percentage of positives was 74·4. Five children (aged 8–15) were all positive, as were 20 natives out of 24, aged 15–30. At ages above 30 the positives declined. Figures are given of percentage of positives further south and it is concluded that positive Wassermanns are more likely to be met with in latitudes near the equator.

"Here in Australia," write the authors, "we have a non-venereal treponematosis widely diffused by the evidence of positive blood Wassermann reactions and the various lesions recounted in this paper, together with pathological bones from parts where the natives have died out. The disease does not exactly resemble yaws, it has not the florid early eruptions, neither are its lesions quite the same as syphilis nor the recently described bejel of the Bedouin Arabs. Hudson (1937), who describes bejel, thinks it is a clinical entity."

They suggest that it merits a distinctive name and propose the native word Irkintja already used by HACKETT and predecessors. They point to the confusion, medical as well as lay, between venereal syphilis, granuloma pudendi and the Australian form of yaws and note that syphilis may be ruled out. For the irkintja eruption the paper should be consulted.

The records are fragmentary and the conclusion is reached that the course of the treponema infection in Australian aboriginal children is not known, nor the mode of infection from child to child.

The civilized (Nepabunna) natives gave negative blood Wassermanns and showed no late treponema lesions. *A. G. Bagshawe.*

GORGAS MEMORIAL INSTITUTE. **Annual Report of the Gorgas Memorial Laboratory for the Period ended June 30, 1937** [CLARK (Herbert C.), Director].—24 pp. 1938. Washington: Govt. Printing Office.

Besides the permanent staff, a number of visiting scientists have worked at the Central Laboratory, at the Miraflores Veterinary Out-Station and at the Santa Rosa malaria control station during the year, while in addition various expeditions have been undertaken.

The Malaria Control Station has made observation on the control of malaria by means of antimalarial drugs and on the correlation between the human and mosquito-parasite index, while work at the Veterinary Station has been limited to studies of *Strongylus vulgaris*. The department of entomology has made extensive investigations of the potential malaria vectors; the protozoological department has been especially concerned with the study of Chagas' disease and a good deal has been done on the snake survey; much work has been carried out by the department of helminthology on the worm diseases of equines, and considerable time has been devoted to the identification and classification of other parasites received from various sources.

In addition to such manifold activities and besides co-operating with the work of other organizations, the laboratory has lent valuable aid to a number of investigations of which nutritional studies and surveys of one sort or another are only examples. *F. Murgatroyd.*

COCHRANE (E.). **Tuberculosis in British Guiana.**—*Tubercle.* 1938. June & July. Vol. 19. Nos. 9 & 10. pp. 403–415; 453–466. With 3 charts. [19 refs.] [Summary appears also in *Bulletin of Hygiene.*]

This is an account of the history of tuberculosis in a colony in which, thanks to accurate statistics, more reasonable conclusions can be arrived at than is usually the case. The population consists of the Negro descendants of slaves, Portuguese, East Indians, Chinese and other smaller groups. The total population (1934) is 323,171 and Georgetown, the capital, has 63,080 inhabitants. The principal industries are the cultivation of sugar cane and rice. The climate is fairly hot, very damp and very even.

The British Guiana Society for the Prevention and Treatment of Tuberculosis was founded in 1907. Dispensaries and branches were opened at various times, and Health Visitors, chosen from women of Negro stock for their education and character, were appointed and have proved to be most successful. The medical work is conducted either by private practitioners or Government Medical Officers.

Collapse therapy was introduced in 1933, and was accompanied by a careful system of contact examination. 324 contacts were followed up in 1933 as against only 40 in 1932. The effects of these two measures have been shown on the attendance figures, 1,640 in 1935 as against a yearly average of about 750 in preceding years from 1920. The methods adopted in the dispensaries are approximately those used in England except that fluoroscopy is perhaps relied upon more, in order to reduce expense.

There are 83 beds available for tuberculosis, the equivalent of 0·35 beds for each death *per annum* from tuberculosis. The refusal to admit patients who are unlikely to benefit from treatment has led to the opinion amongst the population that admission to hospital means the possibility of cure, and admission is now sought after.

The tuberculosis death rate has fallen from 3·19 per 1,000 in 1889–93 to 0·9 in 1929–33 in the colony as a whole. It is thought that the high figures 50 years ago resulted from the previous setting free of the large numbers of slaves, since in 1847 only 29 cases of pulmonary tuberculosis (and those were persons not born in the colony) were found in 1,400 post-mortem examinations, whereas in 1902–5 tuberculosis was the cause of death in 25 per cent. of post-mortems on mainly indigenous Negroes.

The aboriginal Indians now show the highest death rates, and the Negroes are next. The Portuguese shopkeeping class shows fairly high rates and the East Indians and Chinese the lowest. The disease is more caseous in the Negroes than in the East Indians, in whom it tends to be fibrous. Graphs of attack rates are shown and demonstrate that age incidence is earlier in the Negroes than in the East Indians, and also that males and females are approximately numerically equal in the Negroes, but that in the East Indians males greatly outnumber females.

Overcrowding is the rule, and the general diet is deficient in proteins and fat soluble vitamins.

In 98 of 538 necropsies seen or performed by the author, tuberculous lesions were found, causing death in 85. In 42 tuberculous Negro adults, 2 instances of healed foci, 3 cases of childhood type, and 9 cases intermediate between childhood and adult type were found. The

remainder were of adult type, but showed lesions predominantly acute and caseating with very little evidence of extensive fibrotic changes except in three cases. All presented cavities with ragged necrotic walls.

In 15 of the 21 East Indian adult cases tuberculosis was the cause of death, and in 9 of these the adult type was found and a considerable degree of fibrosis was present in all but two. In 11 of the 12 adult Mixed Race cases tuberculosis was the cause of death, and in 8 it was of the adult type, with marked fibrosis in 3.

In 17 of 103 necropsies on children tuberculous lesions were found, causing death in fourteen. The heaviest death rate was in those children under four years of age. The author calls attention to the similarity between the incidence and mortality figures in his (admittedly small) series and those of BLACKLOCK in the series of 1,800 necropsies performed in Glasgow [see *Bulletin of Hygiene*, 1933, Vol. 8, p. 44]. Five of these children (all Negroes) died from peritoneal tuberculosis, but as the consumption of cow's milk is unknown among their class the infection was probably due to infected food or dust gaining access by the alimentary route.

To determine the course of pulmonary tuberculosis, notes on 200 cases were analysed. A history of contact was obtained in 63, but this figure is probably too low. The age group of heaviest incidence was 20–39 years, sputum was almost invariably positive and most of the patients were in stage III. The predominant symptom was cough, and haemoptysis was seen in 23 of 116 Negroes, 10 of 45 Mixed Race and 2 of 20 East Indians. It was usually slight in amount except in the Mixed Race group. The time of survival after notification was shorter and evidence of fibrosis less frequent in the Negroes than in the others. Of 17 children suffering from pulmonary tuberculosis 11 gave a history of contact, 8 recovered, 7 died and in two the prognosis was doubtful. As far as the ultimate results are concerned, the pulmonary tuberculosis of childhood follows the same course in Negro children as in White. Of the 8 who recovered, 3 were cases of epituberculosis and 5 of pulmonary disease.

Collapse therapy was given to 42 patients with open pulmonary disease. Artificial pneumothorax alone was performed on 31, phrenic evulsion alone on 8, and the combined methods on 3. Complete collapse by pneumothorax was obtained in 7 instances; pleural adhesions were common in the Negroes, who formed the bulk of these patients. Of the 42, two-thirds were improved at the time of the writing of this paper, and complete arrest was obtained in two patients treated by phrenic evulsion alone. The period of time over which collapse therapy has been administered is not claimed to have been enough for a true estimate of the results (it was commenced in May 1933), but the fact that improvement was obtained despite lack of proper accommodation, adequate staff and after-care facilities shows that such treatment can be used with advantage in coloured races. It was not uncommonly found that patients failed to attend regularly for refills. If visits by Health Visitors or dispensary physicians failed to ensure regularity, the threat to withdraw all attention was successful in inducing the patients to attend.

Treatment by gold salts and sodium morrhuate was found to give disappointing results.

Only 2 per cent. of the annual notifications were due to tuberculosis of bones and joints. Three per cent. of the cattle and pigs slaughtered

have been condemned on account of tuberculosis since 1924. All milk for human consumption is boiled before use. The author therefore considers that it is doubtful if any of the bone and joint cases are due to the bovine type of *Myco. tuberculosis.*

[This account brings out the principal points in the tuberculosis of Native Races, the importance of contact examination, the comparatively rapid but by no means always fulminant course of the disease, and the fact that, with the application of modern methods of treatment, properly organized, a great deal can be done to help these patients. It should be read in conjunction with the two articles by the author in this *Bulletin*, 1937, Vol. 34, pp. 743 and 819.] *C. W.*

i. NEUMANN (C. Z.). **Treatment of Undulant Fever with Prontosil.**—*Brit. Med. Jl.* 1938. Aug. 13. pp. 342–344.

ii. PETZETAKIS (M. D.). Abortivbehandlung des Maltafiebers durch Prontosil. [**Treatment of Malta Fever with Prontosil.**]—*Deut. Med. Woch.* 1938. Aug. 5. Vol. 64. No. 32. pp. 1147–1148.

iii. BLUMGART (Herrman L.). **Recovery of a Patient with Undulant Fever treated with Sulfanilamide.**—*Jl. Amer. Med. Assoc.* 1938. Aug. 6. Vol. 111. No. 6. pp. 521–523. With 1 chart.

i. Twenty cases of undulant fever were treated. Four were given intramuscular prontosil, 5 cc. on alternate days. The results were meagre in three, but in the fourth the duration of the disease was materially curtailed. The author concludes that the intramuscular dosage was insufficient. Sixteen further patients were treated with prontosil red orally. They were mostly children in the acute stage, and in all the serum reaction to *Br. melitensis* was strongly positive. The initial dose for children was 4 tablets daily, for youths and adults 6 tablets daily. This was gradually reduced to 2 tablets for children and 3 for adults, daily, by the end of the first week. It is advisable to give the drug for several days after the patient has become afebrile.

In 15 of these 16 cases the results were excellent ; in one no benefit was found. The author concludes that if further experience of prontosil red or other sulphanilamide preparations confirms his results, in both acute and chronic cases, this treatment will be ideal for undulant fever.

ii. The author used prontosil for the treatment of a patient with brucellosis of 3 months' duration, whose serum agglutinated both *Br. melitensis* and *Br. abortus* in 1 in 1,000 dilution. The dose was 5 cc. prontosil soluble daily for 10 days by intramuscular injection, and simultaneously (for 20 days) 3 tablets daily by mouth. After an interval of 7 days, again 3 tablets daily for 20 days. After a second interval, of 10 days, again 3 tablets daily for 10 days.

The result was strikingly good, though the serum reaction was positive 1 in 800 three months later.

iii. The patient, aged 33, gave a history of 3 weeks' illness. His serum reaction was positive for undulant fever in a dilution of 1 in 3,600 and brucella was cultivated from his blood. He was given 5 gm. sulphanilamide orally on the first day of treatment, 4 gm. on the second and third days, 1·6 gm. on the fourth and fifth days, 4 gm. on the sixth day, 5 gm. on the seventh and eighth days, and 6 gm. on the ninth day, after which the treatment was discontinued. The temperature was normal from the eighth day onwards and remained so during the

Summary of Reports in Literature to March 1938 on Effectiveness of Treatment of Undulant Fever with Sulfanilamide or its Derivatives.

Author	Number of Cases	Agglutination Titer	Blood Culture	Duration of of illness before Treatment, Weeks	Duration of Treatment with Sulfanilamide or its Derivatives, Days	Time of Disappearance of Fever after Institution of Sulfanilamide, Days	Period of Freedom from Symptoms to Time of Report of Various Authors, Months.
Grouès * ...	2	0	0	?	26	26	2+
		Brucella melitensis 1 : 400 ...	0	2	26	26	2+
Thévenet ...	1	Brucella melitensis 1 : 600 ...	0	3	70	44	?
Berger ...	1	" Bang-Bazillen " 1 : 2,500 ...	0	25	36	12	4
Suchier ...	1	+	0	5	7	7	1+
Béthoux et al.	1	Brucella melitensis 1 : 1,200 ...	+	4	30	26	...
Ahringsmann	2	Br. abortus 1 : 400	0	6	28	7	3
		Br. abortus 1 : 2,500	0	5	20	4	4
Lloyd ...	1	Br. abortus 1 : 12,500	0	1	3	9	1
Richardson	2	Br. abortus 1 : 1,500	0	1	11	8	4+†
		0	0	20	9	6	2+
Francis ...	2	Br. abortus 1 : 800	+	7	6	7	6
		Br. abortus 1 : 1,600	0	5	5	5	4

* In addition to these two cases Grouès reports good results in eight cases from combined treatment with vaccine and sulfanilamide. This author also refers to an unpublished good result attained by Coronat, a colleague, with sulfanilamide in one case of undulant fever.

† One relapse four weeks after first attack promptly responded to sulfanilamide.

6 months since discharge from hospital. Blood culture was negative two days after cessation of treatment.

The author gives the above table of cases treated with sulphanilamide or its derivatives recorded in the literature.

[In addition PUNCH (*Lancet*, 1938, Aug. 20, p. 429) records successful treatment of one case in England with sulphanilamide, and quotes a similar case treated by MATTHEWS (*Brit. Med. Jl.*, 1938, Feb. 26, p. 483).] *C. W.*

ORISSA. ANNUAL PUBLIC HEALTH REPORT OF THE PROVINCE OF ORISSA FOR THE YEAR 1936 AND THE ANNUAL VACCINATION REPORT FOR THE YEAR 1936–37 [VERGHESE (G.), Director].—**Outbreak of Jhin-Jhinia.** p. 17.

In February 1936 an outbreak started in the Balasore district of Orissa Province and in the ensuing four months cases were reported from other districts—Cuttack, Puri and Ganjam. The condition was what is known as jhin-jhinia and more than three thousand cases were reported from Balasore. Females were attacked in greater number than males. The chief symptoms were tingling in the soles, a sensation of pressure in the head, perhaps with headache, and a general tremor. [For more details see this *Bulletin*, 1936, Vol. 33, p. 721.] It is thought to be hysterical in nature or allied to hysteria ; there were no fatalities ascribable to it, but its presence led to a state of panic among the inhabitants. *H. H. S.*

JAMES (Clifford S.). **Tropical Phagedaenic Ulcer in the Pacific.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1938. Apr. 20. Vol. 31. No. 6. pp. 647–666. With 5 figs. (1 map). [10 refs.]

An admirable account of this condition in the South Seas, based on the study of 892 cases admitted to hospital in New Britain (608 cases) and the Solomons.

The author notes the striking correlation between the bacteriological findings of the smear and the clinical state of the ulcer. He inclines to the belief that the fusiform bacillus and the spirochaete are actually one organism. A healed ulcer remains a liability, for the scar tissue, most abundant in slow healing, diminishes the blood supply to the new skin, and contains in its interstices dormant organisms, while the blood vessels in the area suffer an obliterative endarteritis. The scar tissue, therefore, easily breaks down. "If surgical interference is necessary to bring about healing, as much as possible of the scar tissue should be removed."

He adduces striking evidence for the part played by defective nutrition notably the occurrence of an epidemic of ulcer in a starved community, when surrounding villages were unaffected, and two schools, for boys and for girls, graphs for which show the rise in ulcer rate after periods of food scarcity ; the schools were under his care for three years. Two areas of the British Solomons are compared with one in New Britain. All other conditions were similar, but in the Solomons there was plenty of good food, while in New Britain for various reasons the people were underfed. In the former there was only one death from this cause in

4½ years; in New Britain it was the chief cause of mortality (here one third of the patients were under 8 years). Finally the ulcer months follow the north-west monsoon, a period of precarious food supply when fishing is impossible. In 1937 when the monsoon was delayed for six weeks there was a corresponding delay in the ulcer period. As to the vital element which is lacking in the food he thinks that this must be suitable protein and he notes that where fish is freely eaten ulcers are rare. He considers that there is a definite relation between malaria and phagedaenic ulcer. He can recall nine white patients with this disease, all of whom had had malarial attacks but none in non-malarious whites. BUXTON's line of separation between malarial and non-malarial Pacific islands marks also the division between phagedaenic ulcer islands and ulcer-free islands. "The spleen of the average ulcer patient is larger than that of the average general population by an amount equal to one-third of the distance between costal margin and umbilicus." Rennell island was in 1930 and 1933 free from malaria and phagedaenic ulcer (LAMBERT): in 1936 both these diseases were present (CRITCHLOW).

For curative measures the paper must be consulted. Many practical points are given. He starts with a caustic such as McGUIRE's [see this *Bulletin*, 1936, Vol. 33, p. 154]. For larger ulcers he advocates excision and skin grafts, immediate or delayed. He has thus treated 293 cases. "Scar tissue should be whittled away until as nearly as possible normal tissue is reached." Any concomitant malaria or dietary deficiency must be treated.

[CLEMENTS' paper also deals with this region and should be read (see this *Bulletin*, 1937, Vol. 34, p. 436). He found no relation between the splenic index and incidence of ulcer.] *A. G. Bagshawe.*

GUNTHER (Carl E. M.). **The Copper Sulphate Treatment of Tropical Ulcer and New Guinea Mouth Disease.**—*Med. Jl. Australia.* 1938. Feb. 19. 25th Year. Vol. 1. No. 8. pp. 348–350.

"Tropical ulcer and New Guinea mouth disease differ only as to the site of occurrence; each is fundamentally due to food deficiency, each presents as a foul sloughing ulcer, from each can be isolated a spirochaete and a fusiform bacillus and each responds readily to the same form of treatment."

Two types of tropical ulcer occur in New Guinea, one on the foot and leg, such as is common throughout the tropics, the other in the distal half of the terminal phalanges of fingers and toes. The tip of the digit sloughs leaving the nail attached, below which is seen the tip of the phalanx.

New Guinea mouth disease starts on the gums and extends to the cheek. It begins as a marginal gingivitis which affects the teeth sockets; bone sequestra may form. Later the cheek becomes perforated. There may be erosion of blood vessels, sloughing of uvula, perforation of soft palate. Among indentured labourers on a liberal diet with plenty of vegetables, both conditions are rare. When the diet consists of rice and tinned meat they are common. Local treatment is the application of copper sulphate which may be regarded as specific. A solution of 1 in 150 is used; a level teaspoon of the crystals to the standard New Guinea medicine bottle of 26 ounces. It is applied to leg ulcers as a wet compress, to digital ulcers as a

continuous bath, and in the oral form as a mouth-wash.* If grafts are needed to hasten healing, the skin to be grafted should be prepared by the application of copper sulphate compresses for two days. In the digital form when the tissues have become healthy amputation is needed. In the oral form the solution can be freely used; no constitutional effects have been seen. If the mouth cannot be closed a syringe is employed. Teeth, however loose, must not be extracted till all is quiet. A liberal vitamin-rich diet is essential.

Tribute is paid to one Muru, a hospital orderly, who discovered that the application of copper sulphate to a healing ulcer prevented relapse and later succumbed to erosion of a vessel in the oral form of the disease. *A. G. Bagshawe.*

DURAN (Pedro). **Notes on the Treatment of Ulcers of the Legs.**—*Monthly Bull. Bureau of Health.* Manila. 1938. Feb. Vol. 18. No. 2. p. 55.

Neoarsphenamine, though specific for framboesial or syphilitic ulcers of the legs, has practically no effect on septic and tropical ulcers, which constitute the majority found. The treatment advised for these is :—

1. A mild antiseptic solution followed by the application of zinc oxide-ichthyol ointment (or a compress of 10 per cent. solution of magnesium sulphate renewed every two hours).
2. When the inflammation has almost disappeared, apply a compress of 1 per cent. picric acid, renewed daily.
3. When, after several days of these measures, healthy granulations appear, apply a zinc plate over the ulcer. This plate should extend a little beyond the borders of the ulcer and the whole should be covered by a wide strip of plaster. Leave untouched for a week or more. Epithelial growth is rapid and without any other treatment the ulcer finally heals. *C. W.*

SUTTON (Richard L.), Jr. **A Case of Inherited Ainhumlike Hyperkeratosis.**—*Arch. Dermat. & Syph.* 1938. July. Vol. 38. No. 1. pp. 26–31. With 1 fig. [10 refs.]

The patient, a white boy aged 3½ in Kansas, showed transversely grooved hyperkeratoses underlying the interphalangeal joints of both great toes. They became inflamed in summer, when he went barefoot, but healed in winter, when shoes were worn. His mother had had identical trouble, with the same variations according to whether shoes were worn or not, in her youth. No other toes or fingers were affected and no other areas of hyperkeratosis were present. Radiologically it was found that the terminal cancellous tufts were absent and the distal phalanges were shorter than normal. The lesions were exactly similar to those of early ainhum.

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* Details of the treatment of leg ulcers are given as follows :—

"The compresses are of lint soaked in the solution, applied without being wrung out, and lightly bandaged. These are renewed every four hours until the slough separates; once this has occurred they are changed only night and morning, but in the intervals the compress is moistened with the solution whenever it becomes dry. This is continued until the ulcer has almost filled with healthy granulation tissue, when scarlet red ointment and adhesive strapping are applied. The granulation tissue is always covered by a greenish-black layer which can easily be removed, although removal is not necessary.

"Under this régime the slough will separate within thirty-six hours, leaving a firm, clean floor."

The hyperkeratosis probably originated as a result of the weight being taken on the interphalangeal area, owing to the short distal phalanx, rather than on the pad of the toe. Bending of the joint then tends to occlude the blood supply, but this bending is prevented by wearing shoes.

"This exposition of the source of one case of ainhum perhaps may be applied to many cases." The author excludes all amputations due to leprosy, scleroderma, etc., from the category of ainhum, and accepts the description of HYDE and MONTGOMERY. *C. W.*

MARSH (F.). **Heat-Stroke and Heat-Exhaustion.**—Reprinted from *Brit. Encyclopaedia of Med. Practice.* 1937. Vol. 6. pp. 396–415. [87 refs.] [Summary appears also in *Bulletin of Hygiene.*]

This account of heat-stroke and heat-exhaustion, especially as regards the important measures necessary in prophylaxis, should be found very valuable wherever heat disorders are likely to arise—in industry and in hot climates. From the pathological and clinical aspects, the scope of the paper might perhaps have been widened to include the serious cases that have been reported following the therapeutic use of hot and humid air, as in the Kettering hypertherm.

One statement of Dr. Marsh's requires modification. He is not correct in stating that it is "the policy of the Witwatersrand Gold Mines to ignore air-conditioning completely and to depend entirely on fitness and good acclimatisation of the workers." The position is, of course, that adequate ventilation and comfortably cool (sometimes too cool) conditions are provided throughout a great part of most mines. It is at the working face that extreme conditions are encountered, owing to the high degree of humidity maintained as a silicosis-preventive measure and owing also to the engineering difficulties involved.

However, Dr. Marsh gives a survey which embodies most that is definitely known about heat-stroke, which, in a number of important features, is still rather an obscure subject, and for which, as he points out, curative measures cannot yet be said to be altogether effective.

J. S. Weiner.

SUDIBYO (R. M. Slamet). Twee gevallen van huidmelioidosis. [**Two Cases of Cutaneous Melioidosis.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1938. June 14. Vol. 78. No. 24. pp. 1424–1444. With 4 figs. on 2 plates & 1 text fig. [14 refs.] English summary. [Summary appears also in *Bulletin of Hygiene.*]

Few cases of cutaneous melioidosis have been recorded and the occurrence of two such cases in Java is made the occasion for a commentary on the condition. The patients were men of 60 and 55 years of age respectively and the chronic lesion was distributed over the leg and on the foot. Both are said to have been traumatic in origin. The nature of the injury is not stated in the first case; in the second an ulcer followed penetration of a fragment of bamboo between the fourth and fifth toes. They suffered from no loss of appetite, no emaciation, no cough, no pyrexia and no urinary disturbance. It was a chronic lesion in both cases, developing after trauma, malodorous, suppurative, superficially ulcerative, tending to serpiginous spread, covered with crusts and showing abundant white scarring where

healing had taken place. Various tests were applied to exclude syphilis, tuberculosis, dermatomycosis, leishmaniasis and chronic pyogenic dermatitis. A very striking proof of the causation of the condition by *Pf. whitmori* was the ability to isolate this bacillus from all over the lesion in practically pure culture. Cultures from blood, faeces and urine were entirely negative, but serum-agglutination tests were positive at 1 in 400 and 1 in 800. The condition spread slowly by formation of abscesses in the upper layers of the skin with resultant necrosis, colliquefaction and absorption. Exacerbation was frequent. Excellent plates accompany the article and these give a very good idea of the cutaneous appearance. It is rather surprising that this type of melioidosis proved comparatively easily curable by the application of 10 per cent. tincture of iodine after the removal of crusts. A 10 per cent. salicyl ointment was applied also for its keratolytic action. *W. F. Harvey.*

BOERS (E. R. J.), KOUWENAAR (W.) & WOLFF (J. W.). Mycetoma pedis (Maduravoet). [**Madura Foot.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1938. July 5. Vol. 78. No. 27. pp. 1606–1613. English summary.

The interest of this case lies mostly in the fact that the infection must have been contracted locally and is, therefore, the first autochthonous case reported from the East coast of Sumatra. The patient was a Punjabi who had been resident in Sumatra for 19 years when the symptoms first declared themselves, a year before he was seen by the author. A Madurella with black grains (? *M. america*) was isolated. Three cases have been recorded previously in the Netherlands Indies, but the infection in these might have been contracted elsewhere.

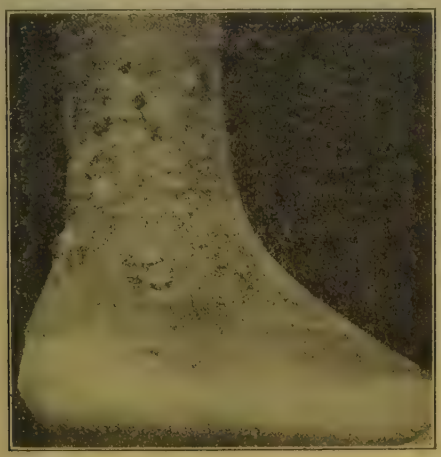
This patient refused operation and was treated by intravenous injections of 10 per cent. sodium iodide in doses of 25 cc. Fifty injections were given in the course of about eight months and cure is said to have been complete. *H. H. S.*

LACAZ (Carlos da Silva). **Chromomycoses.**—*Brasil-Medico.* 1938. June 11 & 18. Vol. 52. Nos. 24 & 25. pp. 555–560; 578–583. With 6 figs. [33 refs.]

This is a general account of Chromomycoses or Chromoblastomycoses as met with in Brazil. It starts with historical references to the first case reported in São Paulo by Alexandrino PEDROSO and José Maria GOMES in 1911, due to *Hormodendrum*, the species *pedrosoi* being named by BRUMPT in 1922. Subsequent records of other cases caused by other species and by *Phialophora verrucosa* and *Acrotheca* are given. The geographical distribution of 48 cases noted up to July 1936 shows that 30 were seen in São Paulo, 8 in Minas Geraes, 4 in Rio de Janeiro, 3 in Pernambuco, 2 in Bahia and 1 in Goyaz. The clinical appearances are described with photographs, not well reproduced. The diagnosis by microscopical means and by culture is discussed and the histological changes produced, ending with a consideration of the individual species of fungi associated and a note on treatment, which is essentially surgical. The article is useful as a summary though nothing fresh is recorded. *H. H. S.*

LOEWENTHAL (L. J. A.). **Multiple Idiopathic Hemorrhagic Sarcoma of Kaposi. Report of a Fourth Case in a Full-Blooded Negro.**—*Arch. Dermat. & Syph.* 1938. June. Vol. 37. No. 6. pp. 972–974. With 1 fig.

Kaposi's disease—multiple sarcoma of the skin—would appear to be rare among negroes. JOJOT and LAIGRET reported a case in the Cameroons in 1922 [see this *Bulletin*, 1924, Vol. 21, p. 16]; PARDO-CASTELLO one in Cuba in 1931; ELLIS one in an American negro in 1935; the present record of a case in Uganda is the fourth. The patient was a native of Bunyoro, aged 45 years. Seventeen months before coming for treatment he had noticed a nodule on the right external malleolus; later others had appeared. There had been a little pain in the joint but the reason for seeking advice was the excessive bleeding when the nodules were injured. When seen by the author there were about a dozen of these on the foot and ankle, each about 1 cm. in diameter, sessile, firm, smooth and not tender. The foot as a whole was oedematous and between the nodules the skin was roughened and scaly (see figure). Histological examination of a nodule revealed the structure of an endothelioma.



Sarcoma of Kaposi in a Negro. The foot is oedematous, and the skin between the nodules is rough and lichenified and shows smooth pigmented scars.

[Reproduced from the *Archives of Dermatology and Syphilology*.

H. H. S.

YOUNG (W. A.) & HAWKING (F.). **Idiosyncrasy to Acriflavine.**—*Lancet.* 1938. June 4. pp. 1275–1276.

A dressing consisting of a plug of gauze soaked in 1/2000 aqueous solution of acriflavine and a covering pad similarly soaked produced, on the third day after application, a swollen, erythematous and painfnl

area, corresponding exactly with the dressing, on the arm of an Indian patient treated for a chronic sinus, in Dar-es-Salaam. Blistering was produced in places. To confirm that this condition was due to the acriflavine a small pad of gauze soaked as before was strapped to the healthy skin of the forearm, and again erythema and inflammation began to appear after two days. The patient stated that this rash had appeared before when similar "yellow medicine" had been applied in other places, and the authors therefore conclude that the reaction was probably not confined to one brand of acriflavine.

Acriflavine is one of the commonest dressings used, but no other similar sensitivity has been observed by the authors. *C. W.*

HABIG (J. M.). Maladie professionnelle des coupeurs de fruits. Ulcère traumatique de la cornée chez le noir. [**An Occupational Hazard in Fruit Cutters.**]—*Ann. Soc. Belge de Méd. Trop.* 1938. Mar. 31. Vol. 18. No. 1. pp. 57–61. [Summary appears also in *Bulletin of Hygiene.*]

Natives employed in the collection of the fruit of the palms in the provinces of Léopoldville and Coquilhatville in the Belgian Congo are exposed to injuries of the eye which should be regarded as legitimate occupational hazards. The injuries are caused by the points of palm leaves, black in colour, which cut or scratch the cornea or conjunctiva. These points are sharp and hard and have a cutting edge. The points are at the ends of the leaves, and the dead leaves hang down close to the trunks of the trees up which the workers climb.

The author believes that these injuries are not due to carelessness on the part of the workers, and explains that when a long thin object is pointed towards the eye, the exact distance of the actual point of that object from the eye is most difficult to estimate. The eye estimates the distance of the principal mass or most clearly seen part of the object, which is not usually its point. He illustrates his argument by showing the difficulty in quickly estimating the distance of the point of a sword directed towards the eye, and by quoting the traffic regulation which requires that a rag be attached to the end of planks or other thin objects carried on and projecting behind lorries, which otherwise are a danger to following motor-cyclists. The difficulty is increased when monocular vision only is possible, which is often the case when these native workers, climbing the palms, encounter dozens of these points simultaneously. Reaction time is important and the author claims that the light and convergence reflexes of natives are slower than those of Europeans.

Clinically the right eye is more often affected than the left on account of the usually more vigorous head movements to the right than to the left in climbing. Erosions, cuts and scratches are seen. The eyeball is rarely punctured, but Descemet's membrane is frequently touched, with all the consequences of that accident. The ulcers do not tend to spread, and heal rapidly, but leave opacities which, being usually central, often interfere with sight and may produce blindness. Traumatic cataract and hypopyon are noted as complications.

A piece of mosquito gauze 7 × 20 cm. with an aperture for the nose, and fastened by elastic round the head, will serve to prevent this accident. *C. W.*

BURNET (F. M.) & FREEMAN (Mavis). **The Rickettsia of "Q" Fever: Further Experimental Studies.**—*Med. Jl. Australia.* 1938. Feb. 12. 25th Year. Vol. 1. No. 7. pp. 296–298. With 1 fig. [Summary appears also in *Bulletin of Hygiene.*]

Additional evidence is brought to show that "Q" fever is caused by a Rickettsia. Mice were inoculated directly with the blood of a patient on the fifth day of illness. Two of the animals killed 13 days later were found to be harbouring rickettsiae in the spleen. Infection was propagated to further mice without difficulty. The organism produced typical febrile reactions in normal guineapigs but not in immune guineapigs. In some mice enormous numbers of rickettsiae were found in the spleen. Advantage was taken of this observation to prepare, by differential centrifugation, suspensions suitable for agglutination. Agglutinins were found up to a titre of 1/400 in experimentally infected monkeys, and up to the same titre in the serum of patients suffering from the disease. The titre, however, seemed to vary greatly in different animals and in different patients. At times no agglutination occurred, or only in very low titres such as 1/2 or 1/4. It is believed, however, that the agglutination test will prove of value in epidemiological studies. Finally, evidence is brought to show that the Rickettsia of "Q" fever is different from the virus of psittacosis [see also this *Bulletin*, 1938, Vol. 35, pp. 62–63]. *G. S. Wilson.*

MOHR (Werner). Zur Frage der Myositis tropica. [**The Question of Myositis tropica.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1938. May. Vol. 42. No. 5. pp. 222–226. [30 refs.]

The case is described of a man who in 1929 went to Liberia and Cameroon where he had malaria, a Loa filaria in the eye and a Calabar swelling on the hand. In 1936 he had boils on both arms and before healing was complete, painful muscle abscesses in the calf and lumbar region. The pus evacuated contained *Staphylococcus albus haemolyticus* as did that of two muscle abscesses which developed later; no trace of filaria in any. The case and the literature are discussed and, though filaria is excluded as a direct cause, it is thought to be a possible predisposing one by trauma to the muscles as CHESTERMAN has suggested. In this instance the boils were a direct antecedent.

Pathologically there is no difference between tropical and non-tropical myositis. *A. G. Bagshawe.*

OOMEN (H. A. P. C.) & KIRSCHNER (L.). Endemisch scleroom in een Minahassisch dorp. [**Endemic Scleroma in a Minahassa Village.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1938. May 3. Vol. 78. No. 18. pp. 1032–1057. With 1 map, 2 text figs. & 16 figs. on 4 plates. [11 refs.] English summary.

Minahassa is a northern residency province of the island of Celebes in the Netherlands Indies. A survey of a remote village with 1,100 inhabitants in this province was made for endemic rhinoscleroma by examining individuals with ear, nose or throat disease. Twelve undoubted and two doubtful cases of this disease were detected and confirmation obtained by the demonstration of typical *Klebsiella scleromatis* bacilli in nasal smears. Complement fixation reactions and

histological examinations were also positive. Nine of the patients were not yet 22 years old, but the disease did not always show itself in deformities, for in 11 cases "the process was scarcely to be detected outwardly" [see also this *Bulletin*, 1937, Vol. 34, p. 433.]

W. F. Harvey.

DEL VECCHIO (Pasquale). Sopra un caso di streptotricosi del polmone. [**A Case of Pulmonary Streptothricosis.**]—*Ann. di Med. Nav. e Colon.* 1938. Mar.–Apr. Vol. 44. No. 3–4. pp. 126–128.

The patient was an Italian male aged 37, born in Eritrea. He was admitted to hospital in Asmara with signs of left lobar pneumonia, which resolved in a few days, but was followed by a period of about three months of slight evening fever (37·5°C.) with cough, thick sputum streaked with blood, night sweats and asthmatic symptoms. Radiological examination showed nodular shadows at the left apex, small thin walled subclavicular cavities and beneath these an ill defined area of consolidation. The lower zone and diaphragmatic movements were normal.

Myco. tuberculosis could not be found in the sputum, but ramified mycelial elements were seen which on culture appeared to belong to the *streptothrix* group. Treatment with large doses of potassium iodide cured the condition in three months.

The author points out the similarity between this clinical picture and that of pulmonary tuberculosis, the differential diagnosis resting on the culture of the organism from the sputum. Eighteen cases only have been reported in the literature. [Such organisms are now classified as *Actinomyces.*]

C. W.

CARRIÓN (A. L.). **Actinomycosis in Puerto Rico.**—*Puerto Rico Jl. of Public Health & Trop. Med.* 1938. Mar. Vol. 13. No. 3. pp. 367–382. With 10 plates. [16 refs.] [Spanish version pp. 383–398.]

This paper deals with the first two cases reported in Porto Rico of a generalized actinomycotic infection, one with an original pulmonary lesion. The pathological details are given and cultures of the causal organisms were made. Typical granules were found in the tissues and exudates of the one case, and in the exudates only of the other. In both instances the anaerobic form, *A. bovis* Wolff-Israel, was isolated. Numerous good micro-photographs are appended. Animal experiments with the two cultures yielded negative results.

D. Erikson.

BENNETT (R. A.). The Differential Diagnosis of Prolonged Pyrexia in India.—*Jl. Roy. Army Med. Corps.* 1938. July. Vol. 71. No. 1. pp. 23–30.

ESCOMEL (E.). La maladie de Carrion ou verruga du Pérou. Les dernières acquisitions. [**Recent Work on Verruga Peruviana.**]—*Bull. Soc. Path. Exot.* 1938. July 6. Vol. 31. No. 7. pp. 536–554. With 5 figs.

FRÉGONNEAU (Werner). Bericht ueber eine epidemieartig aufgetretene Vergiftung mit einem solaninähnlichen Stoff in der Tanga- und in der Nord-provinz des Tanganyikagebietes. [**An Outbreak of Poisoning due to a Solanin-like Substance in Tanganyika Territory.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1938. Aug. Vol. 42. No. 8. pp. 375–379. [Summary appears also in *Bulletin of Hygiene.*]

In the Tanga and Northern Provinces of Tanganyika Territory there was an outbreak, among the German and Swiss settlers (but not British and Greeks) of a condition which suggested to the author poisoning due to atropine or some similar substance. The symptoms were: failure of visual accommodation (especially in young people), dryness of the throat, pasty taste in the mouth, suppression of saliva, swollen tongue and in some cases, difficulty in speaking. Two of the many patients complained of tingling in the hands and feet (not in the tips of the toes and fingers), and one had the sensation of "walking on nothing." Delay in accommodation and lessened reaction to light were observed in the somewhat dilated pupils.

The author was led to suspect rye bread as the cause of these symptoms, and thought that the Kenya grown rye was contaminated with a weed of the nightshade variety. An experiment on two volunteers confirmed the toxicity of the rye, but chemical and pharmacological investigation of the meal, conducted in Hamburg, was inconclusive, although microscopic examination disclosed material definitely of *Datura* species, which commonly contains scopolamine or hyoscyamine. [Unfortunately, no figures of the number affected are given.] *C. W.*

MEI (P. F.) & CHOU (T. Q.). **Two Poisonous Plants,** *Huang-t'eng* **and** *Tsai-chung-yao* **and their Identification.**—*Chinese Med. Jl.* 1938. July. Vol. 54. No. 1. pp. 37–39.

The authors received two plants from the legal authorities with a note that they had caused many fatal cases of poisoning in Hunan and Chekiang. Roots and stems were sent and were reddish yellow in colour. Their names were *Huang-t'eng* and *Ts'ai-ch'ung-yao.* They appeared to resemble another, *Lei-kung-t'eng*, previously examined by the authors, and further investigation revealed that they, all three, belonged to the same genus, Tripterygium, and were very likely identical, *T. wilfodii*, Hook. Tripterine, $C_{25}H_{37}O_3$ and dulcitol, $CH_2OH.(CHOH)_4CH_2OH$ were isolated from all three. This article deals solely with the chemistry of the plants. It would be interesting to have an account of experimental and clinical findings. *H. H. S.*

ABRAMOWITZ (E. William) & SWARTS (William B.). **Dermatitis due to Cocobolo Wood.**—*Arch. Dermat. & Syph.* 1938. Mar. Vol. 37. No. 3. pp. 441–443. With 2 figs.

Cocobolo wood, grown in the tropics, is heavy, of a reddish-brown colour and shows a beautiful grain when polished, and is used for making knife-handles, bowls, walking-sticks and other purposes. G. M. MACKEE in 1913 first recorded its causing dermatitis. The actual cause seems to be an ether-soluble resinous oil, and closely related to that of *Rhus toxicodendron.*

The case is recorded of a man of 42 years, with erythema, serous exudation and scaling on scalp, neck, arms and popliteal spaces; the condition started four months before he was admitted for treatment, when he began to carve a piece of this wood. Not connecting the lesions with the wood he kept on with the work. Patch tests with the sawdust and with an ethereal extract of it were markedly positive; with mahogany and pine, which the patient also used, the test was negative. He had a tendency to seborrhoea and to sweating which may have pre-disposed him to cutaneous irritation. *H. H. S.*

KINGSLEY (Daniel M.). **Acetone Solvents for Romanowsky Stains.** *Jl. Lab. & Clin. Med.* 1937. Feb. Vol. 22. No. 5. pp. 524–531. [36 refs.]

In spite of warnings commonly given against the presence of acetone in solvents for Romanowsky stains, the author found acetone to be a suitable solvent for use with such stains. Reference to original publications failed to show any statement specifically invalidating the use of acetone, whereas the efficacy of such stains used with acetone solvents was noted by several workers. The author was able to prepare a good Romanowsky stain from the requisite dyes using no methyl alcohol, but acetone instead. For use with certified Wright's blood stain it was found better to add 10 to 30 per cent. acetone to an ordinary methyl alcohol solution of the stain and to allow an extra minute or two for staining to compensate for the dilution thus made. *P. H. Martin.*

BESSLER (Carlo). Per la preparazione della soluzione colorante Giemsa. [**Preparation of Giemsa's Stain.**]—*Riv. di Malariologia.* Sez. I. 1938. Vol. 17. No. 2. pp. 162–163. French summary (3 lines).

The author advises that 3·0 gm. Azur Eosin Methylene Blue (sec. Giemsa) Merck be dissolved, in a dark coloured bottle, in 375 cc. pure acetone-free methyl alcohol (Merck) and 125 cc. double distilled glycerine (Merck) be added. This should be kept at 37°C. for 14 days, being shaken once daily, and afterwards at room temperature for 14 days, and should then be filtered into a dark glass-stoppered bottle ready for use.

The diluting fluid should consist of

Monopotassium phosphate	1·0 gm.
Di potassium phospate	2·0 gm.
Distilled water	1,000 cc.

and the proportion of stain to diluent should be 0·4 cc. to 10 cc.

[The use of buffer solutions is also most valuable in the preparation of Ziehl-Neelsen carbol fuchsin, which often loses its intensity fairly quickly if distilled water is used, but retains it with these or similar phosphate solutions in the tropics.] *C. W.*

GOLDBERG (Leon Henri). **A Rapid Method for staining Blood Smears. A Modification of the Original Wright Technique.**—*Jl. Lab. & Clin. Med.* 1938. June. Vol. 23. No. 9. p. 959.

Wright's stain is used and thin films are advised.

1. Cover the smear with the stain, leave on for 10 seconds.
2. Ignite the stain and allow to flame for 10–20 seconds.

3. Drop the slide into distilled water.
4. Remove and dry. It is now ready.

Only nucleated cells will stain deeply but nuclear material is well shown. Red blood cells are only poorly stained. The method is particularly useful when a differential blood count is called for at once ; it is as efficient as any other method. [It is not stated whether this method is useful for staining parasites or not.] *C. W.*

PELLICCIOTTA (Raffaele). Crisi eritrocitaria da clima. [**Erythrocyte Crisis due to Climate.**]—*Arch. Ital. Sci. Med. Colon. e Parassit.* 1938. Apr. Vol. 19. No. 4. pp. 193–222.

The experience of the author in the Harar district of Italian East Africa led him to recognize, in Italians newly arrived in that country, a syndrome which, he claims, has not previously been recorded. The condition occurs within a month or two of arrival and consists of asthenia, headache, vertigo, tinnitus, general and articular pains, loss of appetite and some digestive disturbance. The pulse is small, rapid, and soft. At the same time the erythrocytes are reduced in number, sometimes to as low as 4,200,000. The colour index remains normal and the leucocytes do not show any variation which can be regarded as abnormal.

The duration of the condition may be as long as 8 months, but the prognosis is good. Recovery from the subjective symptoms is accompanied by a return of the blood count to a normal of, usually, over 5 million. Liver treatment has had some beneficial effect, but apart from rest, other treatments have not been found to be of great service.

The author ascribes the condition to the effects of sudden change from a temperate to a tropical climate at a high altitude. He was not able to find any other causative factor. Details of 20 cases are given. *C. W.*

HADEN (Russell L.). **Diffraction Methods for measuring the Diameter of the Red Blood Cell.**—*Jl. Lab. & Clin. Med.* 1938. Feb. Vol. 23. No. 5. pp. 508–518. [17 refs.]

Although cell diameter is not invariably an accurate indicator of cell volume, since in certain microcytic hypochromic anaemias there may be no reduction or even an increase in diameter with a marked decrease in volume while in congenital haemolytic icterus the cells tend to be spherical, knowledge of the mean cell diameter is, however, a valuable addition to blood study. Direct measurement of a sufficiently large number of cells is so laborious that for clinical purposes diffraction methods are generally utilized, and a number of diffraction instruments have been introduced.

PIJPER suggests that his instrument, in which the abnormal film can be compared directly with a normal, may be used qualitatively as well as quantitatively. The mean diameter is determined by measuring the diameter of the yellow ring. The greater the number of macrocytes, the smaller and more intense the violet ring, whereas an increase in microcytes results in a large red ring ; the distance between the violet and the red rings measures the degree of anisocytosis. He differentiates three types of patterns, which are summarized in the present paper as follows :—

Type I : Violet, red, and yellow rings, all small. Distance between violet and red rings relatively large. This pattern means macrocytosis

and pronounced microcytosis (*sic*) typical of pernicious anaemia ["microcytosis " is obviously a misquotation : Pijper wrote " anisocytosis "].

Type II : Yellow ring of normal diameter which means normal mean diameter of cells. Violet ring is smaller, and red ring is larger than normal, indicating more anisocytosis than normal. The distance between the violet and red rings measures the degree of anisocytosis.

Type III : All rings larger than normal and distance between violet and red rings often relatively increased. This is typical pattern of congenital haemolytic icterus (spherocytic anaemia) and the microcytic anaemias due to iron deficiency.

Emmons's instrument consists of two simple telescopic tubes one carrying the light and the other the blood film, the distance between which, for a fixed size of red halo, is calibrated to express the diameter of the cells.

In Bock's apparatus, the light passes through two apertures so that a blood film placed in the beam produces two spectra. A sleeve is adjusted until the outer red bands of the two spectra touch tangentially, as in Eve's halometer.

Using Emmons's, Pijper's or Bock's apparatus the author finds the results check closely with direct measurements excepting in the case of the Bock instrument with very large or very small cells, when the results tend to deviate towards normality. The readings are the same with stained or unstained films with the Emmons or Bock instruments but with the Pijper instrument the diameter measures about $0{\cdot}5\mu$ less on a stained film than on an unstained film. Emmons's instrument has the advantage of portability and not requiring a dark room ; Pijper's is excellent for comparing an abnormal with a normal film and also indicates the degree of anisocytosis as well as the mean diameter. *F. Murgatroyd.*

SANKARAN (G.) & RADHAKRISHNA RAO (M. V.). **Haematological Investigations in South India. Part III. The Mean Red Cell Diameter.**—*Indian Jl. Med. Res.* 1938. Apr. Vol. 25. No. 4. pp. 951–955. With 1 graph.

Diffraction methods for measuring the erythrocyte diameter may give fallacious results with blood films showing extreme anisocytosis or poikilocytosis, and from a critical and scientific standpoint the value attached to the results is sometimes scarcely justified. On the other hand the time consumed by the original Price-Jones method is a serious disadvantage. The authors find, however, that 500 cells can be measured in less than an hour by a modification of the method of Hynes and Martin, in which the image of the cells is projected on a horizontal ground glass screen at a fixed magnification and the diameter ascertained by superimposing a celluloid film calibrated with a number of graduated circles.

The results of examining 25 normal healthy South Indians, of whom 10 were women, are summarized as follows : Mean diameter of R.B.Cs. $=6{\cdot}85\mu$; range of value of mean diameter $=6{\cdot}27\mu$ to $7{\cdot}38\mu$; standard deviation $=0{\cdot}28\mu$. Coefficient of variation $=4{\cdot}1$ per cent. The mean erythrocyte diameter for these South Indians is decidedly lower than the figure for Europeans given by Price-Jones (mean $7{\cdot}202\mu$ with a range of $6{\cdot}661\mu$ to $7{\cdot}492\mu$). At present no reason for this difference can be suggested. *F. Murgatroyd.*

RADHAKRISHNA RAO (M. V.). **Haematological Investigations in South India. Part IV. Haemoglobin in Normal Pregnancy.**—*Indian Jl. Med. Res.* 1938. Apr. Vol. 25. No. 4. pp. 957–969. With 2 figs. [19 refs.]

The haemoglobin values of 100 women with uncomplicated pregnancies were compared with those of 100 non-pregnant women in Coonoor, South India. The women of both groups belonged to the poorer classes and their diet was probably relatively deficient in quality and quantity, milled rice being the main ingredient, supplemented by small quantities of pulses, vegetables and condiments, while milk, meat and eggs were eaten in negligible amounts or not at all.

The mean haemoglobin level in the pregnant group was 15·52 gm. per 100 cc. blood, and in the non-pregnant group 15·81 gm. per 100 cc. blood ; the difference was not statistically significant. There was no correlation between age and haemoglobin level in either the pregnant or the non-pregnant groups, and no correlation could be found between the haemoglobin value and the number of previous pregnancies or the duration of pregnancy. Discussing the iron requirements it is pointed out that menstruation may make greater demands than pregnancy and the results showed that in uncomplicated pregnancy there was no appreciable lowering of the haemoglobin level. The figures obtained for both groups are higher than those reported by other workers in India and this appears to be due to the fact that Coonoor is about 6,000 ft. above mean sea level.

Incidentally the authors point out that technical methyl alcohol (methonol) was quite satisfactory for the preparation of Leishman stain and is only one-tenth as costly as the pure methyl alcohol ordinarily used. *F. Murgatroyd.*

SANKARAN (G.) & RAJAGOPAL (K.). **Haematological Investigations in South India. Part V. The Effect of Altitude on Haemoglobin Content.**—*Indian Jl. Med. Res.* 1938. Apr. Vol. 25. No. 4. pp. 971–977. With 1 chart. [11 refs.]

Since a considerable part of the inhabited area of India is plateau or mountain the authors examined the effect of altitude on the haemoglobin value of 38 British soldiers drafted to Wellington (6,000 ft.) in the Nilgiri Hills from Madras (sea level).

Unfortunately figures were not obtained prior to the journey from Madras, but previous investigations of 125 healthy young Indian men in Madras gave a mean haemoglobin value of 16·57 gm. per 100 cc. blood. The mean level for the soldiers three days after arrival in the hills was, however, lower than this being only 12·84 gm. per 100 cc. blood. After one week it had risen to 17·46 gm. and after three weeks to 19·56 gm. At the end of the fifth week the value was 20·38 gm. and a month later, at the final examination, it was 19·65 gm. The figure for 125 soldiers already resident at 6,000 ft. for two years was found to be 20·38 gm. per 100 cc. blood, so that it appeared that a rapid increase occurred during the first week and that the maximum was reached within four to six weeks.

FITZGERALD concluded that for every 100 mm. fall in the barometric pressure there is a haemoglobin increase of 10 per cent. above the amount present at sea-level, which would imply an increase of 15 per cent. at Wellington over Madras. Actually the increase in the soldiers

was in the neighbourhood of 50 per cent. but it is possible that the values recorded on arrival from Madras were abnormally low in view of the figures for Indians in Madras. Nevertheless the investigation supports the common conviction that it is wise to take things easily during the first few weeks of residence in a hill station.

F. Murgatroyd.

FAERGEMAN (Poul). **The Normal Values for Hemoglobin, Erythrocytes and Cell Volume per cent, and the Corpuscular Constants derived thereof, in Children aged 8–14 Years. Examinations of 300 School-Children in Stockholm.**—*Acta Med. Scandinavica.* 1938. Vol. 95. No. 6. pp. 566–596. [22 refs.]

Although a number of publications deal with the normal blood findings in infancy, and particularly in the first year of life, the remaining period of childhood has been less vigorously studied, and what records there are present considerable disagreement. After summarizing the results of previous workers, the author records his own observations in Stockholm on 300 children aged 8–14 years. They were apparently normal and healthy but by more refined anamnesis and examination a secondary sub-group was selected for comparison; there was approximate agreement between the two groups. The children were also divided into age groups and sexes. Heparinized finger blood was used and haemoglobin value (Hellige), erythrocyte counts and cell volume (haematocrit) were determined, the results being submitted to thorough statistical analysis. For the whole group the following mean values were obtained: haemoglobin 13·432 gm. per cent.; erythrocytes 4·731 millions per cmm.; and cell volume 40·78 per cent. Detailed tables showing the individual records and summarizing the values for the various groups are given.

F. Murgatroyd.

WAUGH (Theodore) & ASHERMAN (Edward G.). **The Use of an Index of Hemolysis in expressing the Fragility of Erythrocytes.**—*Jl. Lab. & Clin. Med.* 1938. Apr. Vol. 23. No. 7. pp. 746–751. With 3 figs.

Previously, by adding 5 cmm. blood to each of ten tubes containing 1 cc. salt solution in increasing dilutions the fragility of the erythrocytes was determined roughly by macroscopic observation or more precisely by counting the number of unhaemolysed cells in aliquot portions of the various tubes. The authors found the enumeration of the cells somewhat laborious and they have now altered the technique so that the haemoglobin liberated by the haemolysis can be directly determined by means of the Evelyn photo-electric colorimeter. The method was found to be rapid and precise.

F. Murgatroyd.

HUMPERDINCK (C.). Vergleichende Hämoglobinbestimmungen mit dem Bürkerschen Hämoglobinometer, dem Hämometer von Zeiss-Ikon und Hämometer nach Hellige. [**Comparative Haemoglobin Determinations with the Haemoglobinometers of Bürker, Zeiss-Ikon and Hellige.**]—*Arch. f. Gewerbepath. u. Gewerbehyg.* 1937. Dec. 24. Vol. 8. No. 3. pp. 321–323.

In the Zeiss-Ikon haemoglobinometer the blood dilution is constant, a number of readings can be made and the average obtained, and the

comparison of the hydrochloric acid solution with the colour scale is easy, as the colour fields are only separated by a fine line.

Tables are given showing a number of comparative observations made with the large Bürker's haemoglobinometer and with the haemoglobinometers of Zeiss-Ikon and Hellige. Blood was obtained from the lobe of the ear with the usual precautions, a free flow being obtained and the first drop rejected.

In the large Bürker's haemoglobinometer the blood is diluted 100 times, reduced with sodium hyposulphite and compared spectroscopically in a comparative optical system with a durable standard reduced haemoglobin solution. For accurate work the colorimetric comparison in the Bürker apparatus is the most reliable.

The tables show close agreement between the values obtained in the Bürker and the Zeiss-Ikon methods, but those obtained with the Bürker and the Hellige apparatus differed considerably.

From his experiments, the author considers the Zeiss-Ikon instrument very useful on account of its handiness and reliability.

F. Murgatroyd.

LEE (Terence). **The Sedimentometer. A Photographic Recorder of the Suspension Stability of the Erythrocyte.**—*Amer. Jl. Med. Sci.* 1938. June. Vol. 195. No. 6. pp. 729–733. With 5 figs. (2 on 1 plate). [13 refs.]

In examining the sedimentation of blood a series of readings at short intervals gives considerably more information than a single reading after some arbitrary period. In order to obviate the obvious inconvenience of taking frequent observations the author has devised his "sedimentometer."* In this instrument light from any reasonable source, including daylight, having passed through a frosted glass window falls on a slot holding the sedimentation tube, where it is transmitted through the plasma but absorbed by the cells. The transmitted light then passes through a lens which focuses an image of the tube on a light sensitive paper behind a narrow vertical slit at the back of the apparatus. The paper is mounted on a simple stage driven across the slit by clockwork so that a continuous record is obtained. A suitably marked transparent film in front of the paper is used to record the time intervals and the degree of sedimentation. For compactness short tubes are used, but the speed of the stage and the magnification of the lens are adjustable to give graphs directly comparable with standard curves for varying tube lengths.

F. Murgatroyd.

CUTLER (J. W.), PARK (F. R.) & HERR (B. S.). **The Influence of Anemia on Blood Sedimentation.**—*Amer. Jl. Med. Sci.* 1938. June. Vol. 195. No. 6. pp. 734–751. With 13 figs. [19 refs.]

Cells of slowly sedimenting blood transferred to plasma of rapidly settling blood, settle rapidly, whereas cells of rapidly sedimenting

* The instrument is manufactured by the Ellis Optical Company, U.S.A., and is distributed in England by Messrs. Hawksley & Sons Limited, London.

blood suspended in plasma of slowly sedimenting blood, settle slowly. These facts are found to be directly correlated with the percentage of cells forming rouleaux and the number of cells in rouleaux under the various conditions of the experiments. A similar correlation was found in further experiments. When the plasma of rapidly settling blood was diluted with physiological saline solution the sedimentation rate was progressively slowed and became almost inhibited when a dilution of one part of plasma in four parts of saline was reached. Cells from this final mixture re-suspended in original plasma again sedimented quickly. The addition of lecithin, sodium oleate, bile salts or formaldehyde to rapidly settling blood inhibited sedimentation, but cells from blood so treated, when washed and re-suspended in original plasma again settled rapidly. On the other hand, the addition of acacia, agar, casein or gelatin to slowly settling blood increased the sedimentation rate, and washed cells from blood so treated re-suspended in the original plasma regained their slow sedimentation rate. Defibrination of the plasma produced but little change in either sedimentation rate or rouleaux formation. In all these and further experiments the sedimentation rate was found to be directly proportional to the formation of rouleaux. The ability of the cells to form aggregates is a function of the plasma and is specific for that plasma. The specificity is little influenced either by the size, although size may be a factor in making up the mass of the aggregates, by the shape or by the number of cells in suspension. Once aggregates form they settle at a speed more or less in accordance with Stokes's law of hydrodynamics ; the greater the mass of the aggregates the more rapid is sedimentation and *vice versa*.

In the graphs of the more rapid sedimentation three phases can be differentiated. The first is a slow phase during which the cells are forming aggregates, the second more rapid phase represents the sedimentation of these aggregates, and the third phase, again slow, represents the final packing of the cells. It is only this third phase that is materially influenced by anaemia itself, in that the fewer the cells, the less volume they occupy. Consequently, sedimentation rates based upon a single observation at the end of some arbitrary period reflect not only sedimentation velocity but also cell volume, and are therefore influenced by the degree of anaemia.

This leads to erroneous conclusions since anaemia itself has little to do with the phenomenon of sedimentation proper. Rapid settling is the result of the cells forming large aggregates or rouleaux and if no aggregation takes place sedimentation is slow no matter how marked the anaemia. Corrections for anaemia based upon readings after removal of plasma cannot give consistent results since sedimentation becomes slow in proportion to the amount of plasma removed. When a large quantity of plasma is removed normal rates may be recorded which do not check at all with the clinical state of the patient. This is wrongly referred to in the literature as " over-correction " ; it is not correction but interference with the mechanism of rouleaux formation to a point where the sedimentation phenomenon practically disappears. When multiple readings are employed the nature of the graph isolates the anaemia factor (packing phase) from blood sedimentation (aggregation and sedimentation phases). The shape of the curve portrays the disease, the index reflects anaemia as well.

F. Murgatroyd.

SUZUKI (Tamotsu) & SATO (Shiu). **A Case with a Remarkable Prolongation of Blood Coagulation : Pseudohemophilia Hepatica (Frank). The First Case published under this Name in Japan, in spite of Possibly Frequent Occurrence in the Newborn Age.**—*Tohoku Jl. Experim. Med.* 1938. July 18. Vol. 33. No. 5. pp. 398–407. With 1 fig.

A male baby, 36 days old, presented a severe haemorrhagic diathesis with remarkable prolongation of coagulation time. Jaundice had occurred four days after birth and again about a month later just before the haemorrhagic tendency became apparent ; the spleen was not enlarged and Murata's reaction for syphilis was negative. The authors believed they could exclude haemophilia, congenital haemolytic anaemia, purpura haemorrhagica, fibropenia, scurvy and any exogenous toxic cause.

They suggest that the jaundice indicated a disordered liver function and that the case was an example of pseudohaemophilia hepatica ; blood coagulation was restored to normal before the jaundice faded completely and the authors state that the prolonged coagulation was probably not due to the presence of jaundice [what was the bile content of the stool is not clear, however]. They believe recovery was due to the administration of " Yakriton, the detoxicating hormone of the liver " [but they also employed oryzamin and blood transfusions].

F. Murgatroyd.

PELLICCIOTTA (Raffaele). Contributo alla conoscenza dell'anemia tropicale. [**On Tropical Anaemia.**]—*Arch. Ital. Sci. Med. Colon. e Parassit.* 1938. May. Vol. 19. No. 5. pp. 257–310. [20 refs.]

In continuation of his recently reported work [see above] the author records that he has seen 43 further cases of the syndrome of anaemia in Italian immigrants into Abyssinia. He divides these into two groups, those who were followed up until cure was complete, and those in whom, for various reasons, the follow up was impossible or the cure uncertain. He describes the 30 cases in the first group, in detail.

The general conclusions are the same as in the previous paper and the author emphasizes the syndrome of temporary hyperchromic anaemia with debility and nervous symtoms, curable without medical treatment and independent of any infection, dietary deficiency or defective hygienic surroundings. It is a specific tropical anaemia occurring in Europeans recently arrived in a tropical country.

C. W.

TROWELL (H. C.). **A Case of Tropical Macrocytic Anaemia.**—*East African Med. Jl.* 1938. June. Vol. 15. No. 3. pp. 69–73.

Hyperchromic anaemia, responding to marmite and not to iron, in a young male Ruanda native without achlorhydria and without increased bilirubinaemia is described. The patient had undergone a period of semi-starvation and the author suggests that the case is one of tropical macrocytic anaemia of nutritional origin.

F. Murgatroyd.

WILLS (Lucy) & EVANS (Barbara D. F.). **Tropical Macrocytic Anaemia: its Relation to Pernicious Anaemia.**—*Lancet.* 1938. Aug. 20. pp. 416–421.

The experimental deficiency anaemia of monkeys, which is supposed to be the animal counterpart of human tropical macrocytic anaemia, responds to crude liver extracts but not to highly purified extracts even in enormous doses. In view of this surprising result the effect of the purified extracts was examined on the human disease.

With anahaemin, although the doses were relatively very high, there was no clinical improvement, no reticulocyte crisis and no appreciable rise in the red cell count. With examen the therapeutic response also appeared disappointing. Fractions made from campolon by extraction with saturated ammonium sulphate did not give clear-cut results but the evidence suggested that in some instances there was a very considerable loss of potency in the insoluble fraction.

It is clear then, that tropical macrocytic anaemia does not respond to the more highly purified liver extracts which contain the liver principle curative in pernicious anaemia in relatively pure form. This further differentiates the two diseases and suggests that, like the nutritional anaemia of monkeys, human tropical macrocytic anaemia is due to a deficiency in the diet of some factor other than Castle's extrinsic factor. The new factor, which does not appear to be vitamin B_1, B_4, lactoflavin or nicotinic acid, is present in crude liver and in autolysed yeast extracts. At present, therefore, all cases of tropical macrocytic anaemia, and the macrocytic anaemia of sprue, should be treated with the cruder liver extracts or marmite. When expense is a consideration a few cc. of some preparation such as campolon, supplemented by the daily administration of 30 to 60 gm. marmite will in most cases induce a rapid remission, and marmite alone will often be sufficient. *F. Murgatroyd.*

NAPIER (L. Everard), DAS GUPTA (C. R.), CHAUDHURI (R. N.), SEN (G. N.), RAI CHAUDHURI (M. N.), SEN GUPTA (P. C.) & MAJUMDER (D. N.). **Anahaemin in Tropical Macrocytic Anaemia.**—*Indian Med. Gaz.* 1938. July. Vol. 73. No. 7. pp. 385–390. With 8 charts.

This paper records experiments undertaken to confirm Dr. Lucy WILLS's suggestion that highly refined anahaemin would probably prove inactive in certain types of macrocytic anaemia as it had done in the macrocytic anaemia of monkeys.

Six cases of macrocytic anaemia in pregnant women were treated with anahaemin. Three cases must be disregarded since one patient died six days after treatment commenced, another showed a reticulocytosis before treatment started and a third was accidentally also given campolon. Of the remaining three, one showed a reticulocytosis of 21 per cent. and an increase of 1 million red cells per cmm. six days after 200 mgm. of anahaemin; the other two showed only a slight increase in red cells after treatment with anaehaemin, although one subsequently responded well to neohepatex.

Three cases of macrocytic anaemia in males failed to respond to anahaemin, but of these patients one had kala azar, another a haemolytic anaemia which equally resisted campolon and iron, while the third was an aplastic anaemia, possibly due to sulphanilamide. A fourth case, which had failed to respond to marmite, gave a slight response after anahaemin and is of interest in that within a fortnight

the macrocytic orthochromic anaemia became a microcytic hypochromic anaemia which on the administration of iron rapidly became normal. Two other cases showed an immediate and marked improvement after anahaemin. Three other cases, which subsequently responded to campolon, failed to respond to anahaemin, but one of these was equally unresponsive to heparnovina, ventriculin and a well-known proprietary liver extract.

Discussing the results the authors point out that marmite, which contains extrinsic factor, and ordinary liver extract, which contains both extrinsic and intrinsic factors, cure tropical macrocytic anaemia; whereas anahaemin, a highly refined liver extract, which is supposed to contain haematopoietin, the combined extrinsic and intrinsic factors, and is so potent in pernicious anaemia, produces no response in some cases of tropical macrocytic anaemia which campolon afterwards cures. The authors suggest that tropical macrocytic anaemia is not a single entity and includes (*a*) a group in which anahaemin is curative, *i.e.*, in which the deficiency is the same as in pernicious anaemia; (*b*) a group in which marmite or crude liver extract is curative, *i.e.*, in which the "marmite principle" is deficient, and (*c*) a possible third group in which campolon is curative but other liver extracts are not, *i.e.*, in which some principle peculiar to campolon is deficient. *F. Murgatroyd.*

SAI (Gen-itiro). Ueber Wirkungen der Bluttransfusion mit Kupfer-Ion auf akute Anämie bei Frauen. [**Injections of Copper in Puerperal Anaemia.**]—*Tohoku Jl. Experim. Med.* 1938. July 18. Vol. 33. No. 5. pp. 369–378.

In view of the therapeutic effect on anaemia of copper by the mouth and the results of injections of copper in experimental anaemia of rabbits the author treated a number of women suffering from loss of blood following childbirth by injections of copper; a 0·1 per cent. solution of purified copper sulphate in 3·8 per cent. sodium citrate was prepared and 0·08–0·1 mgm. copper per kgm. body weight was given.

For comparison, the patients were divided into four groups, whose average blood loss was from 19·6 to 28·83 per cent. Those in the first group were allowed to recover spontaneously and two to three weeks later the blood values still failed to reach their original levels. The patients of the second group were treated by simple blood transfusions of, on an average, 100-200 cc. blood, and in the majority of cases blood regeneration was again incomplete at the end of two weeks. Patients of the third group were treated by blood transfusions with the addition of the copper solution, and their erythrocyte counts were for the most part normal within a fortnight. Patients of the fourth group were only given intravenous injections of copper in saline solution but even this treatment appeared more effective than copper free blood transfusions. No secondary effects of dosage with copper were observed. *F. Murgatroyd.*

SAI (Gen-itiro). Ueber Wirkungen der Bluttransfusion mit Kupfer-Ion auf chronische Anämie bei Frauen. [**Copper in the Treatment of Chronic Anaemia in Women.**]—*Tohoku Jl. Experim. Med.* 1938. July 18. Vol. 33. No. 5. pp. 379–382.

Following his work on the treatment of acute anaemia with copper (see above) the author treated 16 cases of chronic anaemia, mostly in

patients suffering from carcinoma of the uterus, by blood transfusion with the addition of copper; as control, eight similar cases were treated by simple blood transfusion. The blood transfusions with copper were much more effective than the simple transfusions. After simple blood transfusion the improvement in the red cell count was only slight, the average increase two weeks later being 275,000 per cmm., whereas after blood transfusion with the addition of copper the average increase was 876,000 per cmm. Moreover in the same period the average increase in haemoglobin was only 5 per cent. after simple transfusion, but reached the striking figure of 12 per cent. after transfusion with the addition of copper. Study of the blood pictures suggested that simple transfusion temporarily suspended the haematopoietic activity which set in again after a few days but for the most part returned to its original value in a fortnight; against this, blood transfusion with the addition of copper increased the haematopoietic activity immediately and at the end of two weeks the effect was still apparent.

It is suggested that, in the mobilization of red cell reserves as well as in a depressant influence on haemolytic activity, copper strengthens the favourable effects of blood transfusion. *F. Murgatroyd.*

MUNDAY (Betty), SHEPHERD (Marion L.), EMERSON (Louise), HAMIL (Brenton M.), POOLE (Marsh W.), MACY (Icie G.) & RAIFORD (T. E.). **Hemoglobin Differences in Healthy White and Negro Infants.**—*Amer. Jl. Dis. Children.* 1938. Apr. Vol. 55. No. 4. pp. 776–783. With 2 figs.

Comparison of the haemoglobin values of 335 white and of 140 negro babies showed no significant racial difference during the first three months of life. During the remainder of the first year, however, the average values for the white infants were from 0·5 to 1 gm. haemoglobin per 100 cc. blood higher than those for the negro infants, and during this period values for the negro infants were characterized by significantly greater variation than those for the white infants. Despite the differences in haemoglobin, the study failed to establish any significant racial difference between the red cell counts of white infants and those of negro infants.

Dietary changes could not have been responsible for the haemoglobin differences observed and all the subjects were average healthy infants whose nursing was carefully supervised. *F. Murgatroyd.*

SIMICI (D.) & MUNTEANU (V.). Recherches sur l'action hématopoiétique de l'urine dans le traitement des anémies. [**Haematopoietic Action of Urine in the Treatment of Anaemia.**]—*Bull. Acad. Méd. Roumanie.* 1938. 3rd Year. Vol. 5. No. 3. pp. 367–372. With 1 chart.

On the theory that the kidneys possess the property of elaborating haematopoietic substances which are eliminated in the urine and which are comparable with those elaborated by the liver and stomach, the authors administered, by rectal drip twice daily, 300 gm. of fresh urine from a healthy infant to seven cases of anaemia. During 14 to 30 days of treatment there were increases in the erythrocyte counts and, with two exceptions, in the haemoglobin values, while daily reticulocyte counts showed typical curves of blood regeneration.

Whether the hypothetical haematopoietic substances are elaborated or, being performed, are merely excreted by the kidneys the authors are uncertain but they believe that these results show that such substances exist in the urine. No records of any control observations are given and in view of the authors' premise it is not without significance to observe that five of the cases were secondary hypochromic anaemias. *F. Murgatroyd.*

ENGELBRETH-HOLM (J.) & SMITH (C. C. Winkel). **A Source of Error in the White Blood Count.**—*Acta Med. Scandinavica.* 1938. Vol. 95. No. 2–4. pp. 129–135. With 2 figs.

When heparinized or citrated blood is left standing the leucocytes and platelets decrease and finally disappear as a result of autolysis. Similarly, blood diluted with Türk's solution for leucocyte count may also change on standing, the leucocytes in some samples decreasing markedly (as much as 20 per cent.) within a few hours. Incidentally, on the other hand, the peculiar fact was noted that blood from some persons showed no fall in leucocytes. Preservation of the samples at low temperatures failed to inhibit the falls significantly but the addition of 5 to 10 per cent. formalin did, although even with formalin a fall of 10 per cent. may occur during the first few hours.

Since the fall was thought to be due to autolysis by proteolytic enzymes of the leucocytes themselves, the addition of 1 per cent. sodium fluoride to the Türk's solution was tried in an endeavour to destroy such enzymes; a difficulty with this solution, however, was that it failed to haemolyze the red cells. Finally a saponin-fluoride solution (saponin 0·2 gm., methyl violet 0·1 gm., sodium fluoride 2·0 gm., distilled water 200·0 gm.) was used for diluting the blood. The decrease in the leucocyte count with this fluid did not exceed 1 per cent. in 24 hours. A fine precipitate may appear in the counting chamber but it does not impede the counting. The solution should be preserved in a paraffin-lined bottle or be made freshly every few weeks as fluoride loss occurs in contact with glass. If the count can be made immediately after the blood is taken, standard methods are of course adequate for routine procedures. *F. Murgatroyd.*

SCHRETZENMAYR (A.). Die Sternalpunktion in der Tropenmedizin. [**Sternal Puncture in Tropical Medicine.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1938. Apr. Vol. 42. No. 4. pp. 149–161. With 3 figs. [14 refs.]

The author examined the bone marrow obtained by sternal puncture in a number of tropical conditions.

Generally in malarial anaemias the marrow shows a normoblastic reaction but sometimes in chronic malarial anaemia, with much enlargement of the spleen, the marrow changes resemble those of pernicious anaemia with a megaloblastic response. Frequently these cases have other characteristics of pernicious anaemia, *e.g.*, a colour index of one or more, and they respond usually well to liver therapy. [It would be interesting to know whether this type of anaemia is in fact due to uncomplicated malarial infection or whether other factors such as dietetic deficiencies play any part.]

In blackwater fever the marrow shows soon after the attack a marked normoblastic reaction.

In anaemias associated with ankylostome infections the primary reaction of the bone marrow is regenerative but in severe ankylostome anaemia the appearances are those of an aplastic marrow, and in the author's opinion the picture suggests a toxic cause.

In the diagnosis of suspected cases of malaria with negative blood findings thick-drop preparations of bone marrow, treated in the same way as thick-drop preparations of blood, may according to the author yield positive results ; and the method is free from the dangers and difficulties of spleen or liver punctures.

The author states that intramuscular injection into the same or other patient of marrow removed by sternal puncture is useful for treatment. The injection immediately produced a long continued increase of the reticulocytes of the blood which, in his opinion, suggests a strong stimulus of the bone marrow. The hard large spleens of malaria, which frequently resist every therapy, after one or more injections of bone marrow become smaller. [Such resistant spleens must surely be fibrotic and it seems difficult to imagine the mechanism of action of one cc. of bone marrow pulp in such cases ; the author rightly questions whether the results are *post hoc* or *propter hoc.*]

F. Murgatroyd.

PAREKH (J. G.). **Familial Eosinophilia (with a Case Record).**—*Med. Bull.* Bombay. 1938. June 4. Vol. 6. No. 11. pp. 371–375. With 1 chart.

Chance examination of a young man gave the following blood findings : red cells, 5,090,000 per cmm. ; haemoglobin 97 per cent., white cells 42,000 per cmm. The differential white count is recorded as polymorphs 5, lymphocytes monocytes 13·5, eosinophiles 81, premature cells 0·5 per cent. The eosinophil percentages in other members of the family were : father 8, elder brother 2, younger brother 26, and patient's brother 81. [Thus the text ; neither chart nor table, however, shows a " patient's brother " with 81 per cent., and presumably this is the patient himself.] No member of the family ate pork, presumably excluding trichinosis, no member had any history of skin disease, parasitic infection [the stools were not examined] or allergic manifestations ; but the patient said that he developed a generalized purpuric rash whenever he took quinine. Enlargement of the spleen, anaemia and general symptoms of leukaemia were absent. The investigations terminated with the untimely death of the patient, possibly from septicaemia following a fish bone injury, but the author believes he represented a case of familial eosinophilia.

F. Murgatroyd.

SHIRAISHI (Shingo) & SHINDO (Masayuki). **Preliminary Report on Blood Picture of Infantile Preberiberi (Sato) in Comparison with that of Infantile Beriberi and Infantile B-avitaminotic Dyspepsia (Sato).**—*Tohoku Jl. Experim. Med.* 1938. Mar. 15. Vol. 32. Nos. 5 & 6. pp. 470–483. [25 refs.]

There were no essential differences between the blood pictures of 15 cases suspected of infantile pre-beriberi—infants who had been fed with human milk negative to Arakawa's reaction but who presented

negligible symptoms of disease—and those of 5 cases of infantile beriberi and 3 of B-avitaminotic dyspepsia.

In general the red cell count was normal. Of the white cells the neutrophils tended to show a decrease, the lymphocytes an increase with occasional decrease in some pre-beriberi cases, the basophils were normal, while the eosinophils and monocytes were variable. An outstanding feature of all cases was the high degree of thrombocytosis. The peroxidase staining time for the neutrophils was increased.

F. Murgatroyd.

Erratum.

Vol. 35, No. 2, p. 132, in the summary of Dr. D. O. Shiel's paper on a "Comparison of Punctate Basophilia and Ratio of Large to Small Lymphocytes in the Diagnosis and Prevention of Lead Poisoning" it was stated that lead poisoning with disability might be expected "where the concentration of lead in the urine equals or exceeds 1·5 mg. per litre." *For* "1·5 mg. per litre" *read* "0·15 mg. per litre."

REVIEWS AND NOTICES.

ROGERS (Leonard) [K.C.S.I., LL.D., M.D., F.R.C.P., F.R.C.S., F.R.S., Hon. Treasurer Research Defence Society]. **The Truth about Vivisection.**—pp. x+182. With 9 illustrations. 1937. London: J. & A. Churchill Ltd., 104, Gloucester Place, Portman Square. [5*s*.] [Review appears also in *Bulletin of Hygiene*.]

In his evidence before the Royal Commission on Vivisection of 1906–08, Lord Justice Fletcher Moulton, F.R.S., pointed out that the opponents of medical, veterinary and scientific research involving experiments on animals saw only the pain which might be caused to individual animals without thought of the suffering which might be alleviated in countless animals and mankind as a result of knowledge gained by the scientific approach to problems of disease and death by the experimental method. He held that it is our duty "to take that line which produces the minimum total pain," and stated that whether the pain is inflicted pain, or whether it is preventable pain which is not prevented, was in his opinion one and the same thing.

Sir Leonard Rogers, Honorary Treasurer of the Research Defence Society, in his admirable little book entitled "The Truth About Vivisection" has borne this ethical principle in mind and has examined the controversial question of vivisection in respect of the evidence for inflicted pain and cruelty and the evidence that experiments on animals have resulted in the alleviation of suffering to animals and man. Innumerable books, pamphlets and reports have been published on the subject of vivisection but Sir Leonard has brought within the compass of a pocket edition all the main arguments for and against the continued use of animals for research under the Act 39 and 40 Vict. Cap. 77 of 1876 which regulates, controls and permits the use of animals in experimental research in the United Kingdom.

At the commencement of his book Sir Leonard discusses the meaning of the term "vivisection" which is a word calculated to produce a sense of horror in the minds of those who do not realize how loosely it is applied to animal experiments whether they involve an actual cutting operation or not. He points out that the word vivisection was used long before the discovery of anaesthetics and consequently it meant "painful cutting operations upon un-anaesthetised animals." The Act of 1876 which followed the Royal Commission on Vivisection of 1875, enforced the use of anaesthetics of such a power as to prevent the animal feeling pain in surgical operations and in the final report of the second Royal Commission on Vivisection published in 1912 it is recorded that the Chief Inspector of the Home Office, under the Act of 1876, stated that "Vivisection of an animal, in the proper sense of the term, without anaesthetics, has not in any case been allowed by the Secretary of State."

To-day, although the term vivisection does not appear in the Act of 1876, it is used indiscriminately by the opponents of research for every type of experiment carried out under the Act in registered laboratories by licensed research workers, whether their research involves feeding experiments, inoculations, or the external application of medicaments and the routine work necessary for the preparation and standardization of drugs and sera. The anti-vivisectionists continue to take full advantage of the word vivisection with its implication of cruelty and therefore Sir Leonard has divided his book

into two parts. The first part deals very fully indeed with the case of the opponents of vivisection, particularly in respect of the evidence submitted by anti-vivisection witnesses before the Royal Commission of 1906–08. He clearly expounds the terms and administration of the Act of 1876 under which the Home Secretary has power to permit the use of living animals for research and to safeguard such use from abuse. In dealing with the anti-vivisection propaganda subsequent to the publication of the final report of the Royal Commission in 1912, Sir Leonard has drawn largely on the publications of the Research Defence Society, and after pointing out that it is now a common practice for anti-vivisectionists to attack veterinary institutions and hospitals where pathologists hold licences under the Act, he rightly raises the question as to whether such organizations as anti-vivisection societies can legitimately claim to be good charities.

The second part of the book deals with "the case for the medical scientists," and emphasis is laid on the important fact that both Royal Commissions on Vivisection (1875 and 1906–8) "rejected every ground—ethical, humanitarian and utilitarian—on which the anti-vivisectionists demanded legal prohibition of all scientific experiments for the advancement of medical and scientific knowledge." Both Commissions were appointed as a result of the agitation of the opponents of animal experiments and the fullest possible opportunity was given for the anti-vivisectionists to establish their case. Sir Leonard then deals in some detail with the irrefutable evidence that the results of research have benefited man and animals. He points out how fully the belief expressed by the Royal Commission of 1875, that further research would lead to further mitigation of suffering, had been realized by the time of the second Commission in 1906, and in an admirable summary of the outstanding achievements in medical and veterinary science and practice during recent years he covers a wide field. Among the subjects dealt with in this part of the book are the following: thyroid extract, adrenalin, insulin in diabetes, liver hormones for pernicious anaemia; the vitamins in relation to scurvy, rickets, caries of the teeth, beriberi; drugs including soporifics, local anaesthetics, analgesics, the salvarsan group in yaws and relapsing fever, tryparsamide and Bayer 204 in sleeping sickness, antimony in kala azar and bilharziasis, carbon tetrachloride in hookworm disease, plasmoquine and atebrin in malaria; and antiseptic and aseptic methods. In a chapter on the infective diseases of man, plague, cholera, diphtheria and yellow fever are referred to, and finally infective diseases of animals such as anthrax, swine erysipelas, glanders, rinderpest, blackquarter, haemorrhagic septicaemia in cattle, hydrophobia and distemper in dogs and numerous other examples of the results of the application of knowledge gained by research are given.

In view of the strength of the case for research as presented by Sir Leonard, and in fact the urgent necessity for the active prosecution of the search for knowledge by means of the experimental method it would seem to many to be inconceivable that there should be opposition to such humanitarian endeavour. It must be remembered, however, that the average member of the public has but little opportunity of hearing from authoritative sources about research and advances in medicine and science which are common knowledge to professional men and women. This being the case the opponents of research, which they call "vivisection," gain financial and moral support for

their societies through propaganda by shop window displays, articles in the Press, advertisements, literature and canvassing, and not infrequently in this and in other countries persuade ill-informed representatives of the people to try and secure the passing of legislation which would seriously hinder, and, in some cases, actually prevent the alleviation of human and animal suffering. It is therefore still an unfortunate necessity to take effective steps to prevent anti-vivisectionists, however well-meaning they may be, from gaining support and achieving their objective. In order to do this Sir Leonard, in the conclusion to his book, earnestly appeals for the education of the public in the truth about vivisection which the very word itself tends to obscure.

By devoting his time and energy to the preparation of this readable and valuable booklet, which he has fittingly dedicated to Stephen Paget, the Founder of the Research Defence Society, Sir Leonard has himself taken a much needed step towards achieving a wider and better understanding of this controversial subject and in so doing he has performed a service to medical and scientific progress.

G. P. Crowden.

BLACKLOCK (D. B.) [M.D. (Edin.), D.P.H. (London), D.T.M. (Liver.), etc.] & SOUTHWELL (T.) [D.Sc., Ph.D., A.R.C.Sc., F.Z.S., F.R.S.E., etc.]. **A Guide to Human Parasitology for Medical Practitioners.** Third Edition—pp. viii + 259. With 2 coloured plates and 122 text figs. 1938. London: H. K. Lewis & Co., Ltd. [12*s*. 6*d*.]

The first and second editions (1931 and 1935) of this excellent little book have received full notice in this *Bulletin* [Vol. 29, p. 165 and Vol. 33, p. 160]. It is pleasant to find that although the editions increase, the size and price do not do so. The third edition is exactly the same size as the second, and in almost all respects is unchanged. The chapter on malaria has, however, been re-arranged on a plan which, the authors hope, will facilitate the study of the subject by students; and the section on leishmaniasis has been largely re-written in light of the most recent investigations on its transmission.

The reviewer has been unable to find anything which he can criticize with the single exception of the paragraph relating to the development of the pathogenic trypanosomes of man in Glossina. No reference is made to the peritrophic membrane and the important part which this structure plays in the developmental cycle of these trypanosomes in the tsetse.

W. Yorke.

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